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Industrial Wireless LAN SCALANCE W786 outdoor access point

Operating Instructions

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06/2013

A5E02280428-08

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

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The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Information on the Internet

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Safety instructions 2

2.1 General safety information for the SCALANCE W786



⚠ WARNING

Danger from line voltage

After removing the housing cover, there is a risk of touching live parts in the area of the connecting terminals of the power supply adapter.

Only authorized personnel is permitted to open the device and carry out any work on the open device (e.g. connection and disconnection of cables, operating the reset button, replacing the PLUG)!

Introduction

3

3.1 Information on the Operating Instructions

Validity of the Operating Instructions (compact)

These operating instructions cover the following products:

- SCALANCE W786-1PRO
- SCALANCE W786-2PRO
- SCALANCE W786-3PRO
- SCALANCE W786-2RR

These operating instructions apply to the following software version:

- SCALANCE W786 firmware as of version 4.4
  Hardware version AS 3 (RJ-45 interface)
  Hardware version AS 4 (fiber-optic interface)

Note

These Operating Instructions do not apply to the SCALANCE W786-2HPW.

Purpose of the Operating Instructions

Using the Operating Instructions, you will be able to install and connect the SCALANCE W786 correctly. Configuring the SCALANCE W786 and integrating the SCALANCE W786 in a WLAN are not dealt with in this manual.

Documentation on the accompanying CD

You will find detailed information on configuration in the configuration manual SCALANCE W-700 on the accompanying CD in the file:

PH_SCALANCE-W-700_76.pdf

Note

Make sure that you read the explanations and instructions in the README.txt file

3.2 Type designations

Abbreviations used

The information in the manuals for the SCALANCE W-700 product family often applies to more than one product variant. In such situations, the designations of the products are shortened to avoid having to list all the type designations. The following table shows how the abbreviations relate to the product variants.

Product group	The designation . . . stands for . . .	Product name
Ethernet client modules (IP30, cabinet installation)	W74x-1	W744-1 W746-1 W747-1
Ethernet client modules (IP65, installed outside a cabinet)	W74x-1PRO/RR	W744-1PRO W746-1PRO W747-1RR
All Ethernet client modules SCALANCE W	W74x	W744-1 W746-1 W747-1 W744-1PRO W746-1PRO W747-1RR
Access points (IP30, cabinet installation)	W784-1xx	W784-1 W784-1RR
Access points (IP65, installed outside a cabinet, extreme climatic requirements)	W786-xPRO/RR	W786-1PRO W786-2PRO W786-3PRO W786-2RR
Access points (IP65, installed outside a cabinet)	W788-xPRO/RR	W788-1PRO W788-2PRO W788-1RR W788-2RR
Access points with the "RR" range of functions	W78x-xRR	W784-1RR W786-2RR W788-1RR W788-2RR

Product group	The designation . . . stands for . . .	Product name
All SCALANCE W access points	W78x	W788-1PRO W788-2PRO W788-1RR W788-2RR W786-1PRO W786-2PRO W786-3PRO W786-2RR W784-1 W784-1RR
All SCALANCE W devices	W -700	W788-1PRO W788-2PRO W788-1RR W788-2RR W744-1PRO W746-1PRO W747-1RR W786-1PRO W786-2PRO W786-3PRO W786-2RR W784-1 W784-1RR W744-1 W746-1 W747-1

Description

4

4.1 Scope of delivery

4.2 LED display

Information on operating status and data transfer

On the front of the housing, several LEDs provide information on the operating status of the SCALANCE W786:

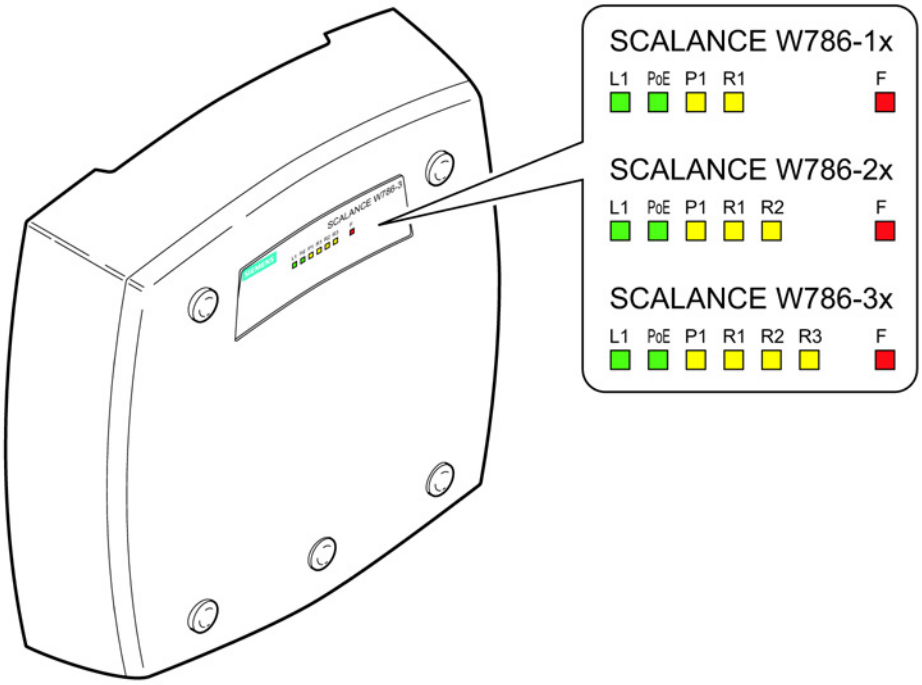


Figure 4-1 The LED display of the SCALANCE W786

Note

The "PoE" LED does not exist on devices with a port for FO cable.

LED	Color	Meaning
L1	Green	Power supply over a power supply adapter or the 48 V DC energy contacts of devices with a port for FO cable.
PoE	Green	Power over Ethernet or power over the 48 V DC energy contacts of devices with an RJ-45 port.
P1	Yellow	Data transfer over the Ethernet interface (traffic).
	Green	There is a connection over the Ethernet port. (Link).
	Flashing yellow	PRESET-PLUG detected.
	Yellow/green	PRESET function completed successfully.
	Flashing green	"Flashing" enabled over PST.
R1	Yellow	Data transfer over the first WLAN interface.
	Green	*Access Point Mode:* The WLAN interface is initialized and ready for operation. *Client Mode:* There is a connection over the first WLAN port.
	Flashing green	*Access Point Mode:* The channels are being scanned. *Client Mode:* The client is searching for a connection to an access point or ad hoc network.
	Green flashing quickly	*Access Point Mode:* With 802.11h, the channel is scanned for one minute for primary users before the channel can be used for data traffic. *Client Mode:* The client waits for the adopt MAC address due to the setting <Auto Find Adopt MAC> and is connected to no access point.
	Green 3x fast, 1x long flashing	*Client Mode:* The client waits for the adopt MAC address due to the setting <Auto Find Adopt MAC> and is connected to an access point.
	Flashing yellow	PRESET-PLUG detected.
	Yellow/green	PRESET function completed successfully.
R2	Yellow	*Access Point Mode:* Data transfer over the second WLAN port. *Client Mode:* The LED is always off because the 2nd port is not available in client mode.
	Green	*Access Point Mode:* The WLAN interface is initialized and ready for operation. *Client Mode:* The LED is always off because the 2nd port is not available in client mode.
	Flashing green	*Access Point Mode:* The channels are being scanned. *Client Mode:* The LED is always off because the 2nd port is not available in client mode.

LED	Color	Meaning
	Green flashing quickly	*Access Point Mode:* With 802.11h, the channel is scanned for one minute for primary users before the channel can be used for data traffic. *Client Mode:* The LED is always off because the 2nd port is not available in client mode.
	Flashing yellow	PRESET-PLUG detected.
	Yellow/green	PRESET function completed successfully.
R3	Yellow	*Access Point Mode:* Data transfer over the third WLAN port. *Client Mode:* The LED is always off because the 3rd port is not available in client mode.
	Green	*Access Point Mode:* The WLAN interface is initialized and ready for operation. *Client Mode:* The LED is always off because the 3rd port is not available in client mode.
	Flashing green	*Access Point Mode:* The channels are being scanned. *Client Mode:* The LED is always off because the 3rd port is not available in client mode.
	Green flashing quickly	*Access Point Mode:* With 802.11h, the channel is scanned for one minute for primary users before the channel can be used for data traffic. *Client Mode:* The LED is always off because the 3rd port is not available in client mode.
	Flashing yellow	PRESET-PLUG detected.
	Yellow/green	PRESET function completed successfully.
F	Red	An error occurred during operation with the SCALANCE W786.
	Flashing red	Ready to load firmware. The device was either stopped with the reset button or there is incorrect firmware on the device.
	Flashing red, R1, R2 or R3 flashing green at the same time	A primary user was found on all enabled channels.

Note

If the LED for the WLAN port is not green when the device starts up, although it is activated, the port is not ready for operation (interface not initialized).

The main reason for this is usually that during commissioning of the SCALANCE W78x products, a waiting time of up to 15 minutes can occur when the ambient temperature is below zero. The device is ready for operation at the specified ambient temperature as soon as the LED for the WLAN interface is lit green.

Note

Primary user (radar) on all enabled channels

If the device detects a primary user on all enabled channels (for example radio waves of a radar station), the LEDs **F** and **R1** flash. No data traffic is then possible for the next 30 minutes. After this time, the device runs the scan again and checks whether a primary user still exists. If no primary user is detected, data traffic is possible again.

The wait time of 30 minutes is necessary due to legal requirements and cannot be shortened even by resetting the device.

4.3 Reset button



WARNING

Danger from line voltage

Once you have removed the housing cover, there is the danger from line voltage in the area of the connecting terminals on the power supply adapter.

Only authorized personnel is permitted to open the device and carry out any work on the open device (e.g. connection and disconnection of lines, operating the reset button, replacing the C-PLUG)!

Functions of the reset button

The reset button is located below the housing cover beside the sockets for external antennas.

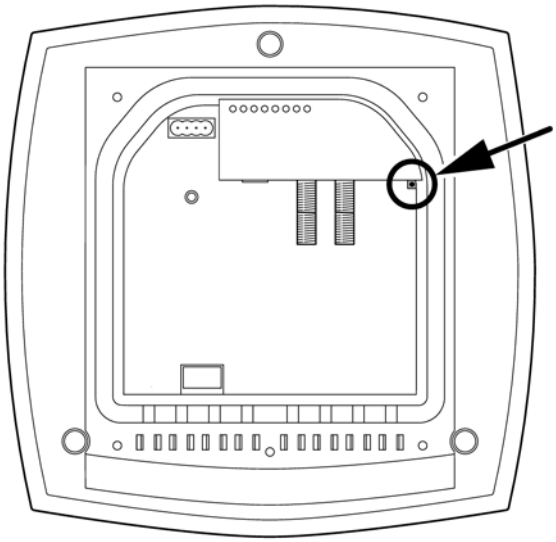


Figure 4-2 Position of the reset button with the housing cover removed

The reset button has the following functions:

- **Restart of the device**

  To restart the device, press the reset button.

- **Loading new firmware**

  If the normal procedure with the Load & Save menu of Web Based Management was completed successfully, the reset button can be used to load new firmware. This situation can occur if there was a power outage during the normal firmware update.

- **Restoring the default parameters (factory defaults)**
- **Adopting the configuration data from the PRESET PLUG.**

Mounting

5

5.1 Removing / fitting the housing cover

When does the housing cover need to be removed?

You can only perform the following activities when the cover is removed.

- You want to screw the SCALANCE W786 to a wall or onto the optional mounting plate.
- You want to connect cables to the SCALANCE W786 for the power supply, for Ethernet or for external antennas.
- You want to insert a PLUG in the device or replace an existing PLUG.
- You want to use the reset button.

Removing the housing cover



⚠ WARNING

Danger from line voltage

After removing the housing cover, there is a risk of touching live parts in the area of the connecting terminals of the power supply adapter.

Only authorized personnel is permitted to open the device and carry out any work on the open device (e.g. connection and disconnection of cables, operating the reset button, replacing the PLUG)!

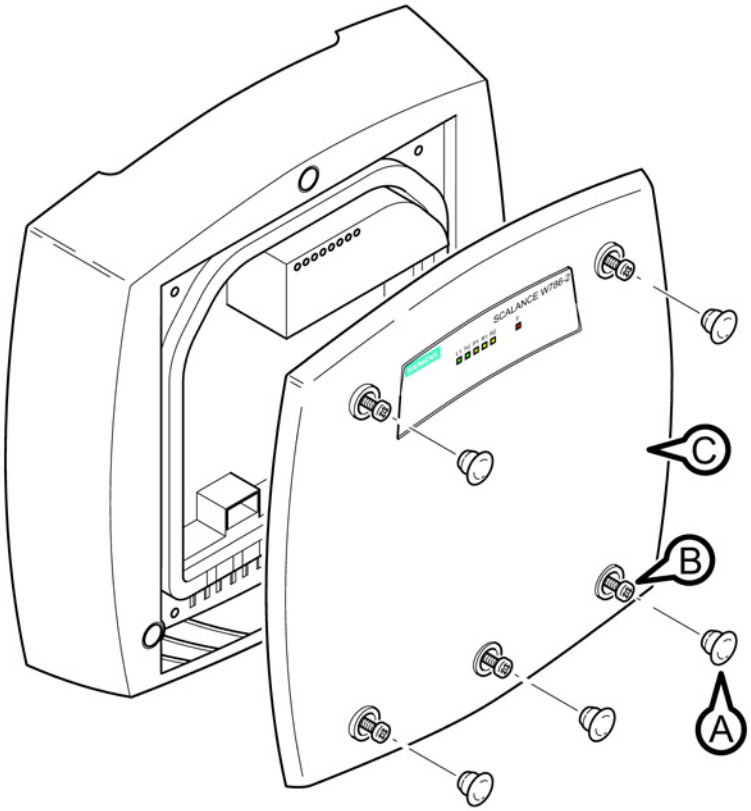


Figure 5-1 Removing the cover
A Sealing cap
B Cover screw
C Housing cover

Follow the steps below to remove the housing cover:

1. Remove the sealing caps from the housing cover (position **A** in the figure above)
2. Loosen the screws in the cover (position **B** in the figure above).
3. Remove the housing cover (position **C** in the figure above).

Fitting the housing cover

Fitting the housing cover is carried out in the reverse order. Tightening torque for the cover screws 1.8 Nm.

5.2 Connecting up cables

Connecting up cables prior to mounting

Before you screw a SCALANCE W786 to a wall or to the optional mounting plate, the cables for the power supply, for Ethernet, and, when necessary, for the external antennas must be connected up first. The available options are as follows:

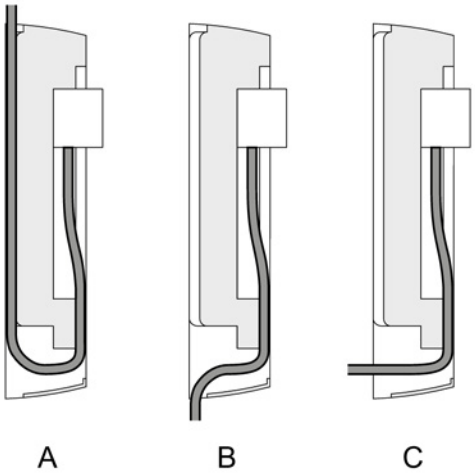


Figure 5-2 Side view of a SCALANCE W786 with cables entering from different directions

- The cables are inserted from above (position **A** in the previous schematic). The housing of the SCALANCE W786 has an opening at the top for this purpose.
- The cables are inserted from below (position **B** in the previous schematic). There is also an opening at the bottom for this purpose.
- Cables inserted through a wall behind the SCALANCE W786 (position **C** in the previous schematic). In this case, you will need to mount the SCALANCE W786 so that the opening in the wall is located above the lower edge of the device.

Connecting up FO cables

Fiber-optic cables have a minimum bending radius. The cable must not be bent tighter than this bending radius during installation or operation, otherwise the FO cable will be irreperably damaged.

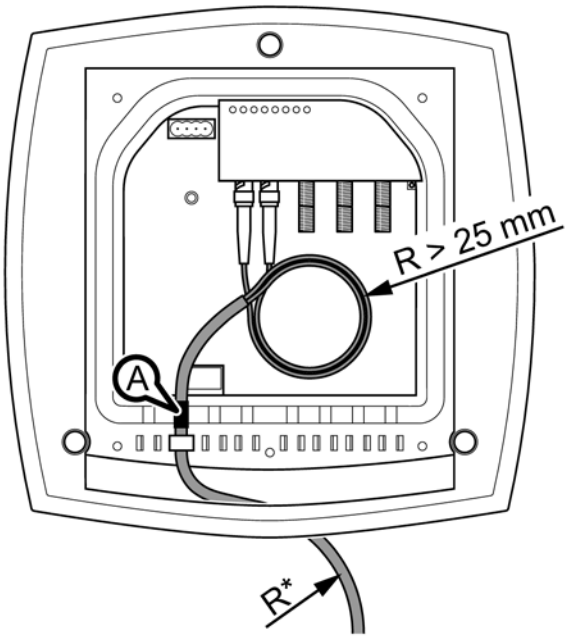


Figure 5-3 Connecting up an FO cable

For the FO cable, use the second opening from the left in the seal. Cable routing is illustrated in the figure above. For individual cores immediately following the connector, the minimum bending radius is 25 mm. Refer to the specification of the cable you are using for the minimum permitted bending radius of the cable within the jacket. Make sure that the FO cable is not sharply kinked after passing through the housing.

An adhesive sealing foil must be used in the housing sealing with FO cables (position **A** in the figure above). For more detailed information, refer to the section "Connecting the cables".

Grounding terminal

⚠ WARNING

To operate the SCALANCE W786 safely, the chassis ground connector must have a suitable cable connected. Do not use the SCALANCE W786 without a ground cable connected.

The chassis ground connector is located on the rear of the device (M4 thread). Connect the ground cable before you mount the SCALANCE W786 on a wall or on the optional mounting plate. Once the SCALANCE W786 is mounted, the connector is no longer accessible.

Place the supplied toothed washer directly on the rear of the device before screwing on the ground cable. Only then can you be sure that there is ideal contact with the screwed-on cable.

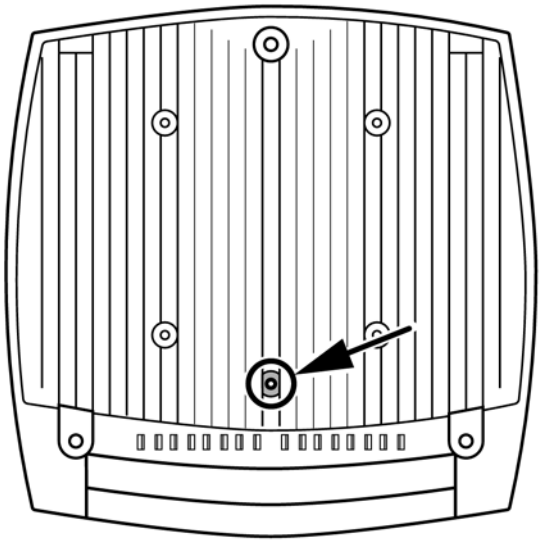


Figure 5-4 Chassis ground connector on the rear of the SCALANCE W786

5.3 Mounting without an adapter (wall mounting only)

Drilling template

Note

Installation location

The following should be noted with regard to the installation location:

- Devices with an internal antenna must be aligned according to the characteristics of the internal antenna (refer to the technical specifications of the antenna --> Radiation pattern diagrams). Since the internal antennas are integrated in the housing, the location and alignment of the housing decides the radiation direction of the antennas.
- There are no restrictions relating to devices without internal antennas.

The location of the holes for mounting the SCALANCE W786 on a wall is shown in the following figure:

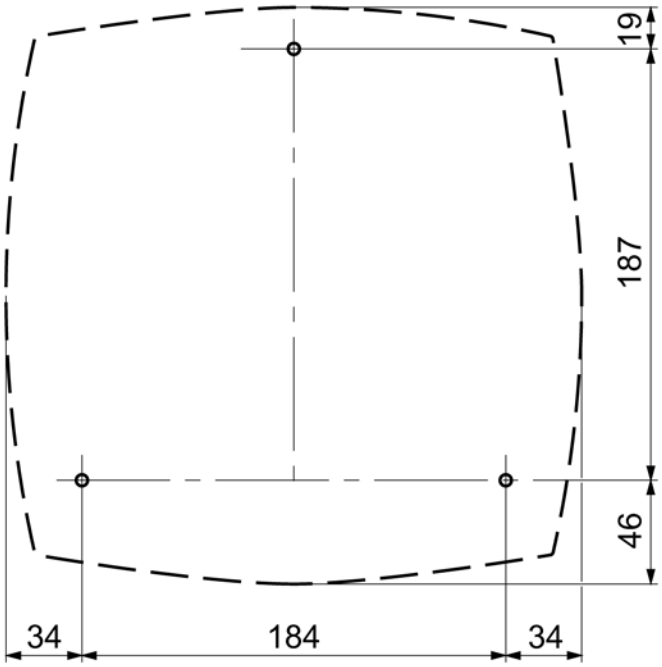


Figure 5-5 Drilling template for wall mounting of the SCALANCE W786

Procedure

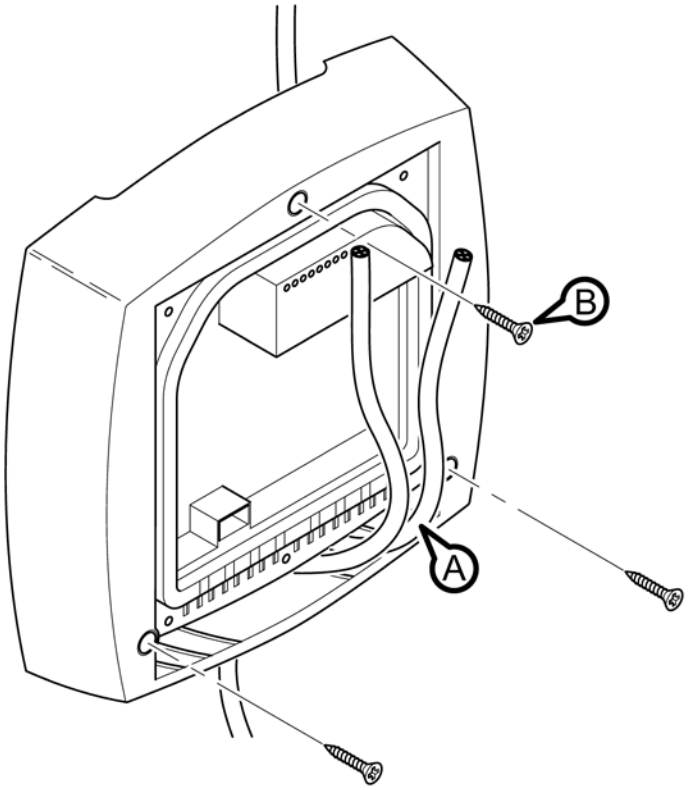


Figure 5-6 SCALANCE W786 wall mounting

Follow the steps below to screw a SCALANCE W786 to a wall:

1. Lead the cables into the housing of the SCALANCE W786 (position **A** in the figure above). Note the information in the section "Connecting up cables".
2. Secure the SCALANCE W786 to the wall with three screws (position **B** in the figure above). The screws are not supplied with the device. The type and length of the screws depend on the type of wall.
   Type of screw:
   - for wooden walls: wood screw 4 x 30 mm
   - for concrete walls: 4 x 50 mm with 5 mm concrete plug
   - for metal walls: M4 x 25 mm with machine thread in the wall

Option: Threaded holes on rear of housing

When a wall is extremely thin, it is often not possible to use wall plugs for the screws. To allow wall mounting even in this situation, there are four M4 threaded holes on the rear of the SCALANCE W786. The drilling template is a square with sides 100 mm long. The device can therefore be mounted on a wall with bolts through the wall.

Calculate the length of the required M4 screws as follows:

Screw length = wall thickness + 7 mm

5.4 Mounting with mounting plate

5.4.1 Fitting the mounting plate to a wall

Drilling template

Note

Installation location

The following should be noted with regard to the installation location:

- Devices with an internal antenna must be aligned according to the characteristics of the internal antenna (refer to the technical specifications of the antenna --> Radiation pattern diagrams). Since the internal antennas are integrated in the housing, the location and alignment of the housing decides the radiation direction of the antennas.
- There are no restrictions relating to devices without internal antennas.

The location of the holes for fitting the mounting plate to a wall is shown in the following figure:

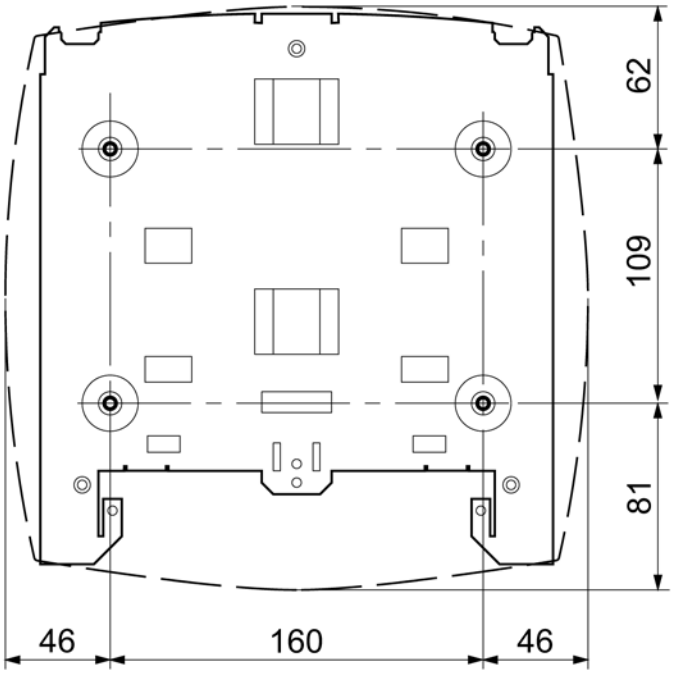


Figure 5-7 Drilling template for fitting the mounting plate to a wall

Procedure

Secure the mounting plate to the wall with four screws. The screws are not supplied with the device. The type and length of the screws depend on the type of wall.
Type of screw:

- for wooden walls: wood screw 4 x 30 mm
- for concrete walls: 4 x 50 mm with 5 mm concrete plug
- for metal walls: M4 x 25 mm with machine thread in the wall

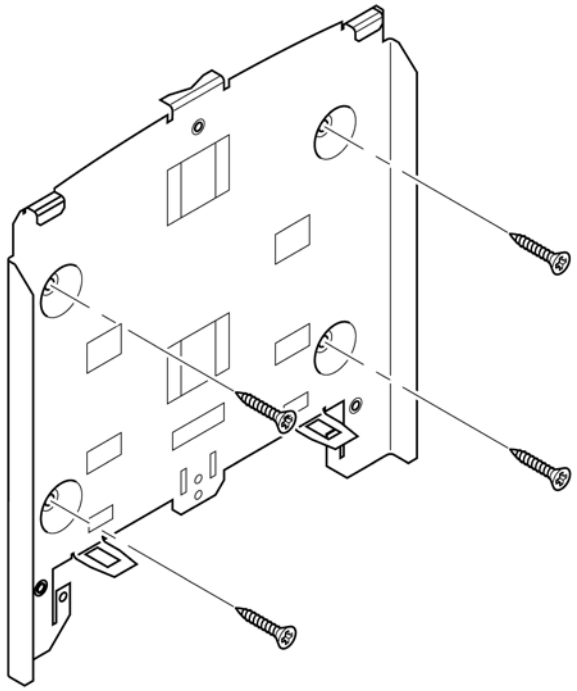


Figure 5-8 Fitting the mounting plate for the SCALANCE W786 to a wall

5.4.2 Screwing the cover plate for the cable feedthrough to the mounting plate

Protection of the cable feedthrough against strong water jets

The cabling of a SCALANCE W786 is led out of the rear of the device. The housing seal is effective only when it is not subjected to water jets. If the device is mounted on a wall, this is the case and no further measures are necessary. When mounted in any other way, except for mounting on an S7-300 standard rail, an additional cover plate must be screwed to the mounting plate.



⚠ WARNING

Danger from line voltage

If the cable feedthrough is subjected to strong water jets, water can penetrate the device and create a live connection to the line voltage. There is then a risk of electric shock.

Make sure that you use the cover plate for the cable feedthrough if you do not mount the SCALANCE W786 on a wall.

Procedure

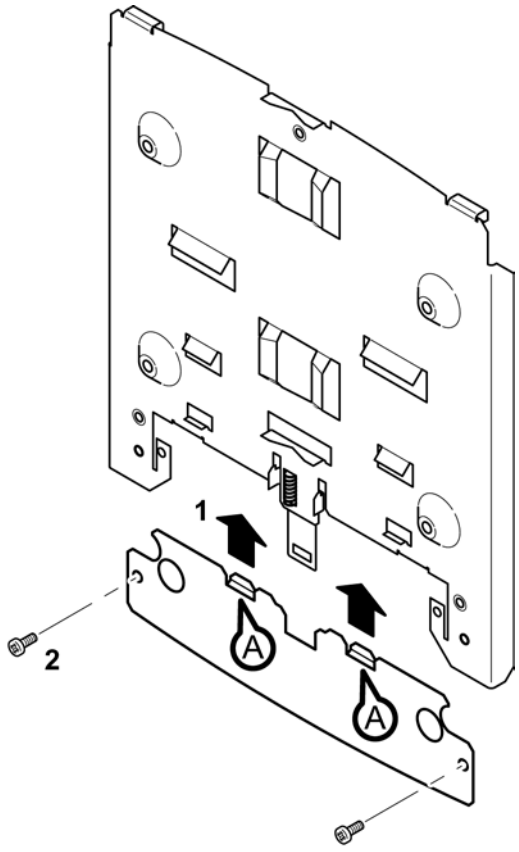


Figure 5-9 Fitting and securing the cover plate for the cable feedthrough

To screw the cover plate for the cable feedthrough to the mounting plate, follow the steps below:

1. Fit the cover plate on the mounting plate from below until the two lugs (position **A** in the figure above) engage the lower edge of the mounting plate.
2. Secure the cover plate to the mounting plate with two M4 screws. The screws are supplied with the assembly kit.

5.4.3 Fitting the mounting plate to an S7-300 standard rail

Procedure

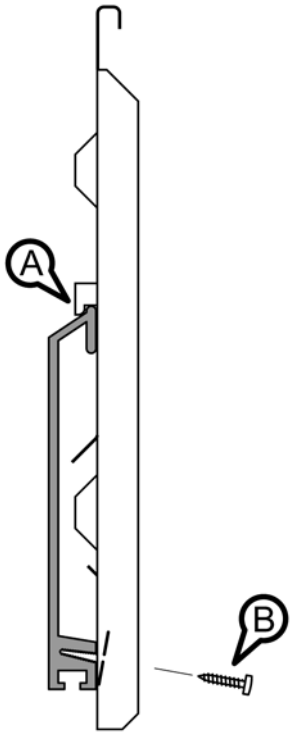


Figure 5-10 Side view of a mounting plate on an S7-300 standard rail

Follow the steps below to fit the mounting plate to an S7-300 standard rail:

1. Place the mounting plate with the two protruding catches on the top edge of the S7-300 standard rail (position **A** in the figure above).
2. At the bottom, the mounting plate has two lugs with holes. Screw the lugs to the S7-300 standard rail (position **B** in the figure above). The required screws are supplied with the mounting plate.

5.4.4 Fitting the mounting plate to a DIN rail

NOTICE
No DIN rail mounting when used on ships If the SCALANCE W786 is used on ships, the DIN rail mounting is not adequate to hold the device in place. In such cases, mount the SCALANCE W786 on an S7-300 rail or on an S7-1500 rail.

Procedure

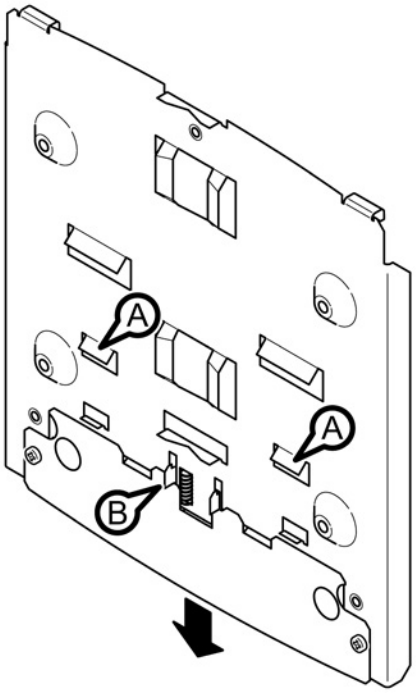


Figure 5-11 Mounting plate with fittings for DIN rail mounting

Follow the steps below to fit the mounting plate to a DIN rail:

1. Place the mounting plate with the two catches (position A in the figure above) on the upper edge of the DIN rail.
2. Pull down the DIN rail sliding catch (position B in the figure above) and press the mounting plate against the DIN rail until the sliding catch engages.

5.4.5 Fitting the mounting plate to a mast

Procedure

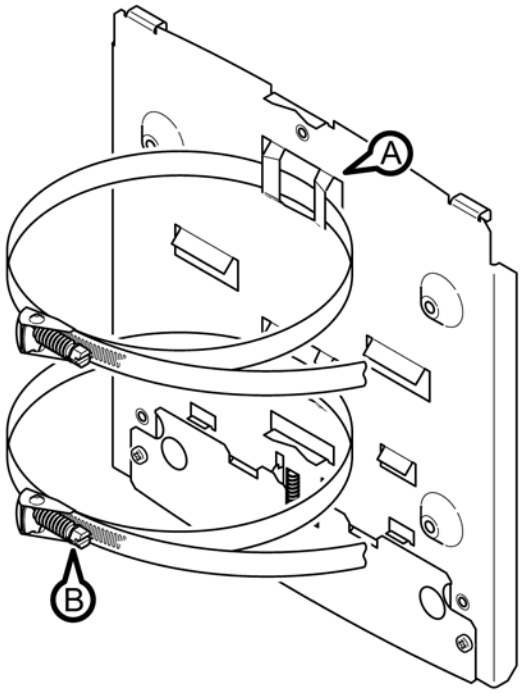


Figure 5-12 Mounting plate with fittings for mast mounting

Follow the steps below to fit the mounting plate to a mast:

1. Feed the fastening straps through the openings in the mounting plate (position **A** in the figure above).
2. Place the fastening straps around the mast at the required position.
3. Feed the free end of the strap through the quick-release fastener. You can twist the tensioning screw (position **B** in the figure above) to the side to adapt a fastening strap to the diameter of the mast.
4. Press the tensioning screw against the fastening strap and tighten the tensioning screw, tightening torque 4.5 Nm.

5.4.6 Fitting/removing the SCALANCE W786 to/from a mounting plate

Procedure for mounting the device

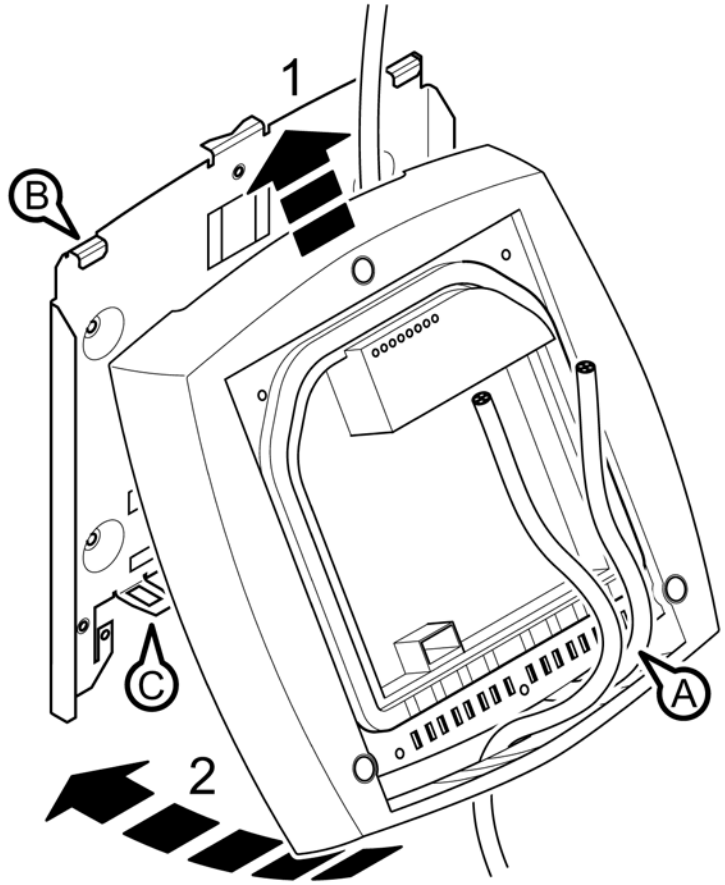


Figure 5-13 Fitting the SCALANCE W786 to a mounting plate

Follow the steps below to fit a SCALANCE W786 to a mounting plate:

1. Lead the cables into the housing of the SCALANCE W786 (position **A** in the figure above). Note the information in the section "Connecting up cables".
2. Fit the SCALANCE W786 so that the upper edge of the rear of the housing is below the two catches of the mounting plate (position **B** in the figure above).

3. Push in the SCALANCE W786 until it engages in the notches at the lower edge of the mounting plate (position **C** in the figure above).

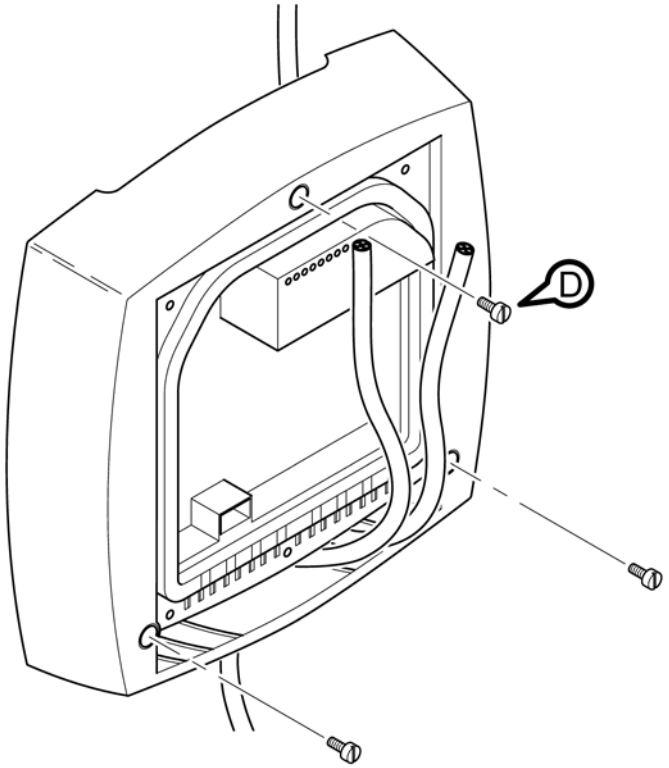


Figure 5-14 Screwing a SCALANCE W786 to a mounting plate

4. Screw the SCALANCE W786 using the three M4 screws supplied with the mounting plate (position **D** in the figure above), tightening torque 1.8 Nm.

Procedure for removing the device

Follow the steps below to remove a SCALANCE W786 from a mounting plate:

1. Loosen the screws between the SCALANCE W786 and mounting plate.
2. Using a screwdriver or similar tool, press down the two lugs on the lower edge of the mounting plate (position **C** in the first figure in this section) and release the SCALANCE W786 from the recesses.
3. Pull out the lower edge of the SCALANCE W786 to the front and then release it from the two clips on the mounting plate (position **B** in the first figure in this section).

Connecting up

6

6.1 Lightning protection, power supply, and grounding

Notes on lightning protection



⚠ WARNING

Danger due to lightning strikes

Antennas installed outdoors must be within the area covered by a lightning protection system. Make sure that all conducting systems entering from outdoors can be protected by a lightning protection potential equalization system.

When implementing your lightning protection concept, make sure you adhere to the VDE 0182 or IEC 62305 standard.

Suitable lightning conductors are available in the range of accessories of SIMATIC NET Industrial WLAN:

Lightning protector LP798-2N (order no. 6GK5798-2LP10-2AA6 is the most suitable version)

Lightning protector LP798-1N (order no. 6GK5798-2LP00-2AA6)



⚠ WARNING

Danger due to lightning strikes

Installing one of these lightning protectors between an antenna and a SCALANCE W-700 is not adequate protection against a lightning strike. The LP798-2N and LP798-1N lightening protectors only work within the framework of a comprehensive lightning protection concept. If you have questions, ask a qualified specialist company.

Note

The requirements of EN61000-4-5, surge immunity tests on power supply lines, are met only when a Blitzductor is used with 12 - 24 V DC and 48 V DC:

12 - 24 V DC: VT AD 24V type no. 918 402

48 V DC:
BXT ML2 BD S48, Part no. 920245
BXT BAS, Part no. 920300 (base)

Manufacturer: DEHN+SÖHNE GmbH+Co.KG, Hans Dehn Str. 1, Postfach 1640, D - 92306 Neumarkt, Germany

Note

48 V lightning protector

When using the 48 V DC lightning protector, the power supply must be fused with 1 A.

Safety extra low voltage



⚠ WARNING

Danger to life from overvoltage, fire hazard

The equipment is designed for operation with Safety Extra Low Voltage, SELV by a Limited Power Source, LPS. (This does not apply to 100 V ... 240 V devices.)

This means that only Safety Extra Low Voltage (SELV) with Limited Power Source, LPS complying with EN60950 / EN 60950-1 / VDE0805 must be connected to the power supply terminals. The power supply unit for the equipment power supply must comply with NEC Class 2, as described by the National Electrical Code (r) (ANSI / NFPA 70).

If the equipment is connected to a redundant power supply (two separate power supplies), both must meet these requirements.

Exception:

Power supply with PELV (according to VDE 0100-410 or IEC 60364-4-41) is also possible if the generated rated voltage does not exceed the voltage limits 25 V AC or 60 V DC.



⚠ WARNING

Take measures to prevent transient voltage surges of more than 40% of the rated voltage. This is the case if you only operate devices with SELV (safety extra-low voltage).

Redundant power supply

NOTICE

Setup with redundant power supply (Power over Ethernet + 24 V DC or 48 V DC)

To use a redundant 24 V power supply (or 48 V with SCALANCE W786) and Power over Ethernet (PoE), a separate floating 24 V source (or 48 V source for W786) must be available for each SCALANCE W-700. Otherwise there is no longer isolation of the input voltages of different devices required for the PoE function and functionality may be disturbed.

Power supply without power grid

To operate the device without a connection to the power grid, you can use a solar panel. The company Solis Energy (www.solisenergy.com) offers suitable solutions. The size of the panel required depends on the daily hours of sunlight. The manufacturer provides assistance in selecting the panel. The solar solution must be designed for 15 watts.

Grounding

NOTICE
Damage to the device due to potential differences To fully eliminate the influence of electromagnetic interference, the device must be grounded. There must be no potential difference between the following parts, otherwise the device or other connected device could be severely damaged: • Housing of the SCALANCE W-700 and the ground potential of the antenna. • Housing of the SCALANCE W-700 and the ground potential of a device connected over Ethernet. • Housing of the SCALANCE W-700 and the shield contact of the connected Ethernet cable. Connect both grounds to the same foundation earth or use an equipotential bonding cable.

Interruption of the power supply

NOTICE
Damage to the Ethernet interface Repeated fast removal and insertion of the Ethernet cable when using Power-over-Ethernet and when there is a redundant power supply can cause damage to the Ethernet interface. Avoid repeatedly removing and inserting the Ethernet cable when using Power-over-Ethernet and a redundant power supply.

Notes on operating the device in a hazardous area

⚠ WARNING
EXPLOSION HAZARD
DO NOT CONNECT OR DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

⚠ WARNING
EXPLOSION HAZARD
SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2 OR ZONE 2.

⚠ WARNING
EXPLOSION HAZARD
DO NOT OPEN WHEN ENERGIZED.

Special notes for the SCALANCE W786-xPRO/RR

Warning Notices cULus haz.loc.

This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D; Class I, Zone 2, Group IIC or non-hazardous locations.

WARNING - Cat. Nos. EAP-Wx-yy-zx (US installation only):

- PLTC cable type and manufacturer shall be specified: Listed (QPTZ), Type 5240U1 (Waterdog PLTC-ER) manufactured by Belden.

- The PLTC cable for the power supply must be installed in a manner to avoid tensile stress at the termination fittings in accordance with Article 501.10 (B)(1)(4) of the NEC.

- The PLTC cable for the power supply must be installed in accordance with Article 725.154 (D)(1) through (D)(4) of the NEC.

WARNING -Cat. Nos. EAP-Wx-yy-zx (Canadian installation only):

- TC cable type and manufacturer shall be specified: Listed (QPOR), Type JZ-604 TC manufactured by Helukabel GmbH.

- The TC cable for the power supply must be installed in areas of industrial establishments that are inaccessible to the public and in a manner that meets the requirements in Rule 12-2202(2) of the CEC:
Installed in conduit, other suitable raceway, or direct buried, when not in cable tray. Provided with mechanical protection where subject to damage either during or after installation. Installed only where qualified persons service the installation.

When operated in potential hazardous areas:

WARNING - Explosion Hazard – Do not disconnect while circuit is live unless area is known to be non-hazardous

6.2 Suitable cables for the SCALANCE W786

Cable specification

The following table lists the requirements for a cable depending on the use case.

Application	Specification
Direct 48 V DC supply	• Round cable cross-section with 6 to 8 mm diameter. • Permitted tensile load at least 100 N. • UL listing: Type PLTC or ITC
Power supply adapter 12 - 24 V DC	• Round cable cross-section with 6 to 8 mm diameter. • Permitted tensile load at least 100 N. • UL listing: Type PLTC or ITC
Power supply adapter 100 - 240 V AC	• Round cable cross-section with 6 to 8 mm diameter. • Three-core cable with 0.5 - 1.5 mm^2 cross section of the individual cores. • Permitted tensile load at least 100 N.
Ethernet	IE FC TP Standard Cable GP 2 x 2 (type A) Order no. 6XV1 840-2AH10 IE TP Torsion Cable 2 x 2 (type C) Order no. 6XV1 870-2F IE FC TP Trailing Cable 2 x 2 (type C) Order no. 6XV1 840 3AH10 UL listing: Type PLTC or ITC (the three named types have this approval)
Multimode FO cable	FO Standard Cable GP Order no. 6XV1 873-2A Minimum bending radius 65 mm. You will find detailed information on preassembled cable lengths and connectors in the catalog "IK PI".
Multimode FO cable	FO Robust Cable GP 2G50/125/900 Order no. 6XV1873-2R (expected to be available as of 03/2010) Halogen-free, UV-resistant cable for indoor and outdoor use for ambient temperatures -40 °C ... +70 °C.

⚠ WARNING

If temperatures in excess of 70° occur on the cable or at the housing socket, or the temperature at the branching points of the cables exceeds 80°, special measures need to be taken.

If the device is operated at an ambient temperature of 55 °C - 70 °C, make sure that you use cables with a permitted ambient temperature of at least 90 °C.

Antenna connector: N-Connect/R-SMA connecting cable

The N-Connect/R-SMA male/male flexible connecting cable is available as an accessory for direct connection of an antenna to a SCALANCE W-700.

Length in m	Order number
1	6XV1875-5CH10
2	6XV1875-5CH20
5	6XV1875-5CH50
10	6XV1875-5CN10

Antenna connector: N-Connect/ N-Connect connecting cable

The N-Connect/N-Connect male/male flexible connecting cable is available as an accessory for connecting an antenna to the lightning protector LP798-1N.

Length in m	Order number
1	6XV1875-5AH10
2	6XV1875-5AH20
5	6XV1875-5AH50
10	6XV1875-5AN10

There is a control cabinet feedthrough available for IWLAN devices located in a control cabinet. You will find detailed information in the catalog IK PI.

6.3 Connecting the cables

Procedure



⚠ WARNING

Danger from line voltage

If the housing is not perfectly sealed, there is a danger to life due to the line voltage if the SCALANCE W786 is subjected to spray water or dampness. Make sure that you keep to the following safety rules.

- Before connecting up, turn of the power supply.
- The sealing of the cable feedthroughs of the SCALANCE W786 is only assured when the cable has a suitable diameter and adequate tensile strength. Only use cables that meet the specifications in the section "Cables for the SCALANCE W786". When connecting up a FO cable, make sure that you use the adhesive sealing foil supplied with the SCALANCE W786.
- Never wrap insulating tape, adhesive tape or other materials around thinner cables to achieve the required diameter. In this case, neither the housing seal nor the strain relief clamps can fulfill their function.
- Close all unused openings in the housing seal with the sealing plugs supplied with the SCALANCE W786. Do not use fillers or any other material under any circumstances.



⚠ WARNING

Danger from line voltage

If the supply cable of a power supply adapter for 100 – 240 VAC is disconnected from the mains power, a dangerous voltage may be present for a brief period.

For this reason, do not connect the contacts of the supply cable to the mains power supply using a plug-in connector but screw the contacts to a terminal block that can be disconnected from the mains power by a switch.

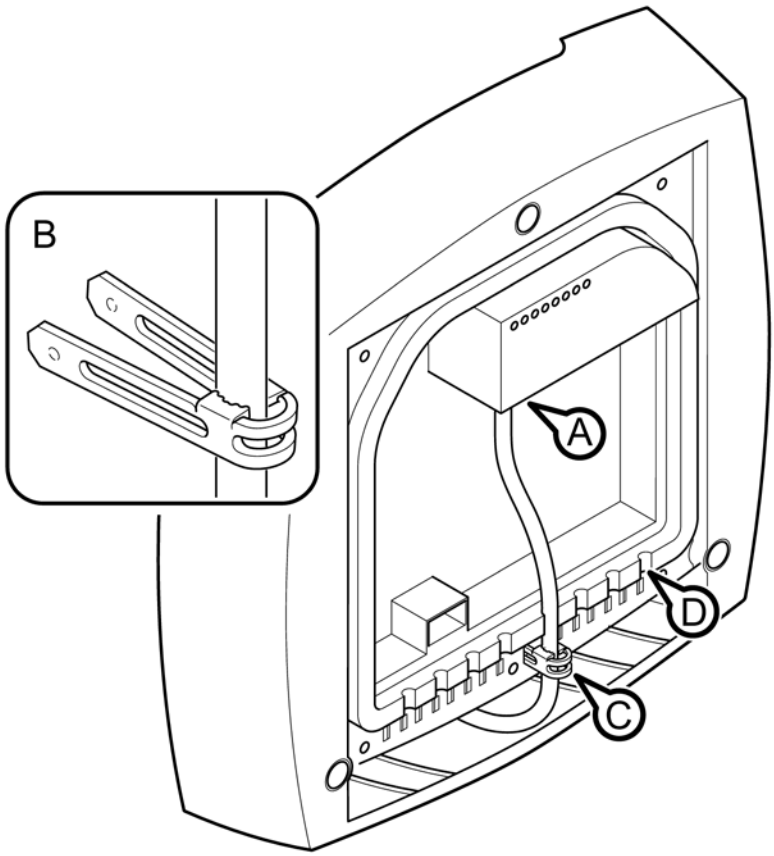


Figure 6-1 Connecting a cable and fitting the strain relief clamps

Follow the steps below to connect cables to the SCALANCE W786:

1. Connect the cables to the appropriate contacts. (Position **A** in the figure above) You have the following options:
   - Connect cables preassembled with a connector (Ethernet, antennas) by inserting the connector into the appropriate socket. Secure antenna cables by tightening the sleeve nut of the connector (key size SW8). You will find more information on this topic in the sections "Connection for Industrial Ethernet" and "Connections for external antennas".
   - 48 VDC power supply. Use the connector supplied with the SCALANCE W786. For details of the terminal assignment, refer to the section "Connectors for the power supply".
   - 12 - 24 VDC or 100 - 240 VAC power supply. With these power supplies, you require a power supply adapter (do not ship with the SCALANCE W786). You will find more information in the section "Connecting a power supply adapter".
2. Fit a strain relief clamp to the connected cable. The toothed part of the clamp must enclose the cable completely (as shown by position **B** in the figure above).
3. Press the strain relief clamp into the housing until the cable is located completely in the opening in the housing seal (position **C** in the figure above).

4. Seal all openings not required for cables with sealing plugs (position **D** in the figure above).
5. Fit these sealing plugs in a strain relief clamp. The lower surrounding notch must be enclosed by the toothing of the strain relief clamp (as shown in the figure below). Press the strain relief clamp into the housing until the sealing plug is located completely in the opening of the housing seal.

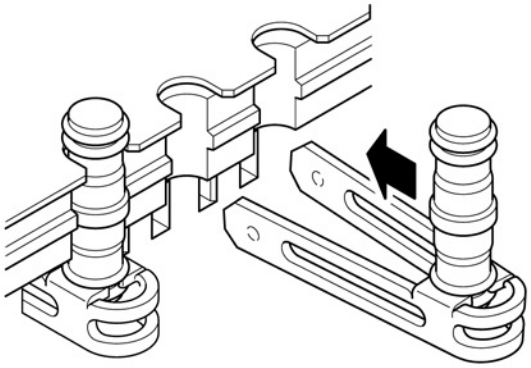


Figure 6-2 Securing a sealing plug with a strain relief clamp

Note

Keep unused sealing plugs and strain relief clamps for later use.

Points to note when connecting an oval FO cable

Note

The following information does not apply to the FO Robust Cable GP 2G50/125/900 (order no. 6XV1873-2R). This cable type has a round cross-section and does not need additional adhesive sealing foil.

The oval FO cable specified for use with the SCALANCE W786 FO Standard Cable GP (order no. 6XV1 873-2A) does not have a circular cross section. As a result, remember the following points when connecting up such cables:

Seal

Fit the supplied adhesive sealing foil at the point where the cable goes through the housing seal. Only then will you achieve perfect sealing of the housing. Follow the steps outlined below:

1. Remove the protective foil and wind the adhesive sealing foil completely around the oval FO cable at the appropriate position **transverse** to the cable.

Strain relief clamp

When you fit the strain relief clamp, make sure that the FO cable is in the correct position. The shorter sides of the cable must make contact with the toothing of the strain relief clamp.

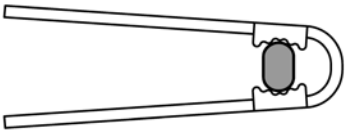


Figure 6-3 View from above with an FO cable inserted in the strain relief clamp

6.4 Connectors for the power supply of the SCALANCE W786

Possible power supplies

The following power supplies are suitable for the SCALANCE W786:

- 48 VDC direct voltage
  Use the two-pin connector supplied with the SCALANCE W786.
- 12 - 24 VDC direct voltage
  Use the power supply adapter 12 - 24 VDC available as an accessory.
- 100 - 240 VDC direct voltage
  Use the power supply adapter 100 - 240 VDC available as an accessory.
- Power over Ethernet (PoE, only with the RJ-45 variants)
  If an eight-wire Ethernet cable is used, it is possible to supply power over the four wires that are not used as data lines. As an alternative, the voltage can be modulated onto the data lines ("phantom power").
  If a Fast Connect Ethernet connector is used to allow cable assembly in the field and due to its greater mechanical strength, you can only use four-wire cables. In this case, only phantom power is possible. This does not represent a restriction for the user because PoE-compatible power equipment always provides both options.

Procedure for connecting the supplied connector for 48 VDC

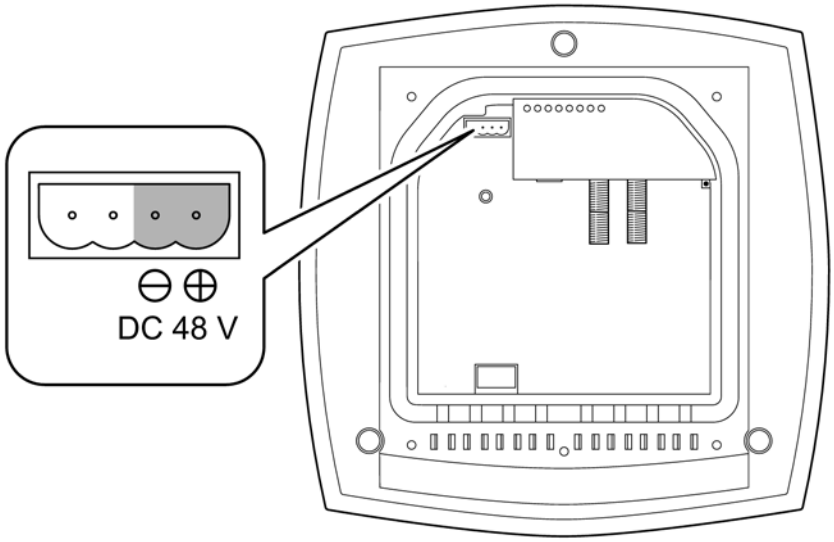


Figure 6-4 Position of the opening in the housing for the power supply with the housing cover removed

Perform the following steps to connect a 48 VDC cable to a SCALANCE W786:

1. Connect the supplied connector to the 48 VDC cable. The figure above shows the location of the socket in the housing and the contact assignment. The connector is safe against polarity reversal and can only be inserted in the right-hand half of the housing. When connecting the cores, you should therefore make sure that the connector is oriented as shown in the following figure.

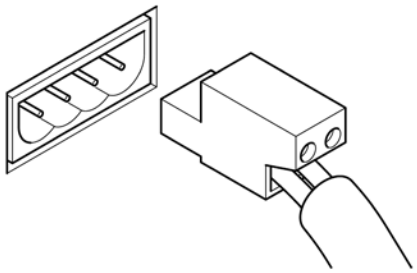


Figure 6-5 Position of the connector when inserted in the socket of the housing

2. Press the connector into the socket in the housing until it engages.
3. Secure the power cable with a strain relief clamp. For more detailed information on this topic, refer to the section "Connecting the cables".

6.5 Connecting a power supply adapter

Input voltage options

The optional power supply adapter is available in two versions:

- Power supply adapter for 12 - 24 V DC direct voltage
- Power supply adapter for 100 - 240 V AC alternating voltage

Note

Applies only to SCALANCE W786-3xx

If a SCALANCE W786-3xx is operated with diversity for three antenna pairs, the power for 12 - 24 V DC cannot be supplied redundantly. In this case, there is no further opening in the housing for a second power cable.

How to fit the power supply adapter



⚠ WARNING

Danger from line voltage

Only electrical specialists may open the device and connect the power supply adapter!

Connect or disconnect power supply cables only when the power is turned off!

Start the SCALANCE W786 only when you have screwed down the housing cover again so that there is once again protection against touching live parts!

NOTICE

Exceeding the EMC limit values

- **SCALANCE W786 with RJ-45 interface with DC power supply adapter or without power supply adapter**

When using a SCALANCE W786 with RJ-45 connector without a power supply adapter or with a DC power adapter, no additional measures are necessary for use in a residential environment.

- **SCALANCE W786 with RJ-45 interface with AC power supply adapter PS791-2AC**

When using a SCALANCE W786 with a power supply adapter PS791-2AC (100-240 V AC), the requirements for use in an industrial environment are met without any additional measures being necessary.

When used in a residential environment, noise produced by this configuration can be reduced by fitting an EMC ferrite (a snap ferrite) to the power supply cable as close as possible to the power supply adapter. You can order suitable ferrites from the following company:

Würth Elektronik eiSos GmbH & Co. KG
Max-Eyth-Strasse 1 – 3
D-74638 Waldenburg, Germany

Model designation: STAR-TEC with safety key technology
cable diameter 6 – 7.5 mm: Order no. 74271131
cable diameter 7 – 8.5 mm: Order no. 74271132

- **SCALANCE W786 with fiber-optic interface**

The SCALANCE W786 devices with a fiber-optic interface generally only meet the emission limit values for use in an industrial environment.

If you use the power supply adapter PS791-2AC (100 -240 V AC voltage) in a domestic area (EMV class B), fit an EMC ferrite (a snap ferrite) to the supply cable as close as possible to the power supply adapter. This measure is unnecessary in an industrial environment.

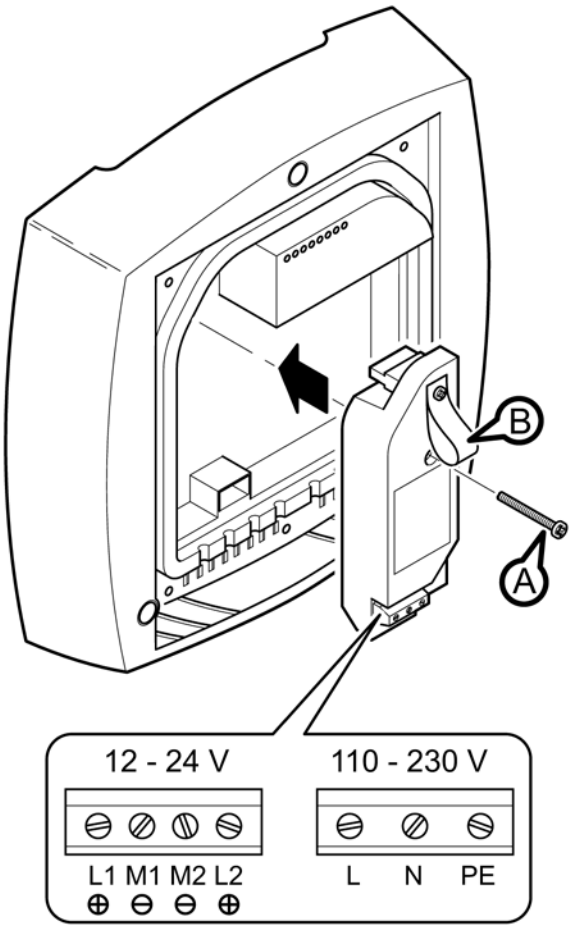


Figure 6-6 Using a power supply adapter in a SCALANCE W786

Follow the steps below to fit and connect a power supply adapter:

1. Fit the power supply adapter in the SCALANCE W786 as shown in the figure above. The connector on the rear of the power supply adapter must engage fully in the socket of the housing. The entire rear surface of the power supply adapter must make contact with the inner surface of the SCALANCE W786.

NOTICE
Only use the loop (position **B** in the figure above) to remove the power supply adapter from the SCALANCE W786! This prevents the connector skewing on the back of the power supply adapter and breaking off.

2. Connect the power supply adapter and the SCALANCE W786 with the screw supplied with the power supply adapter (position **A** in the figure above).
3. Connect the cable for the power supply. The assignment of the contacts is illustrated in the figure above.
4. Secure the power supply cable with a strain relief clamp. For more detailed information on this topic, refer to the section "Connecting the cables".

The following applies to the **PS791-2AC (AC 100 – 240 V)** only:



⚠ WARNING

Danger from line voltage

The strain relief clamp may damage the insulation under unfavorable circumstances. You run the risk of encountering danger from line voltage through the strain relief clamp.

For a line with 100 to 240 VAC use an insulated strain relief clamp only; it is included in the scope of delivery for the power supply adapter!

How to remove the power supply adapter

Follow the steps below to remove a power supply adapter from a SCALANCE W786:



⚠ WARNING

Danger from line voltage

Only electrical specialists may open the device and remove the power supply adapter!

Connect or disconnect power supply cables only when the power is turned off!

1. Disconnect the power supply cable from the power supply adapter.
2. Loosen the securing screw of the power supply adapter (position **A** in the figure above).
3. Pull the loop (position **B** in the figure above) to remove the connector on the rear of the power supply adapter from the socket in the housing and remove the power supply adapter.

6.6 Connection for Industrial Ethernet

Device variants

With a SCALANCE W786, you have the choice of two Ethernet ports:

- RJ-45 jack
- ST duplex socket for multimode FO cables 1310 nm and a maximum cable length of 3000 m

Procedure for connecting an Ethernet cable

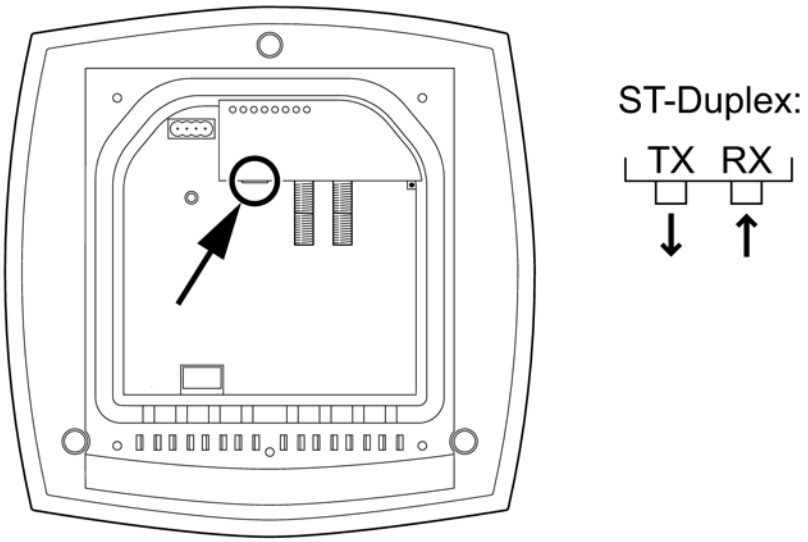


Figure 6-7 Position of the Ethernet port with the housing cover removed

Perform the following steps to connect an Ethernet cable to a SCALANCE W786:

1. Insert the connector of the Ethernet cable in the corresponding socket of the SCALANCE W786. If you use FO cables, make sure that the transmit and receive lines are correctly connected. The location of the socket for RX and TX is shown in the figure above.
2. Secure the Ethernet cable with a strain relief clamp. For more detailed information on this topic, refer to the section "Connecting the cables".

6.7 Connectors for external antennas

How to connect external antennas

Note

The distance between the antennas of the various WLAN interfaces must be at least 1 m.

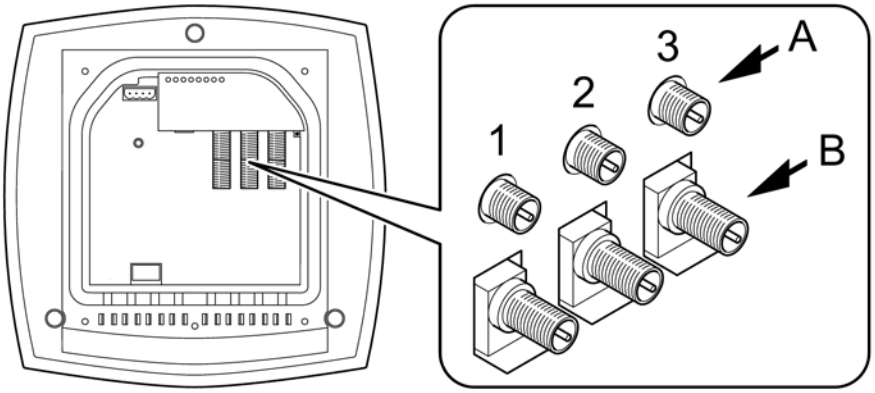


Figure 6-8 Position of the ports for external antennas with the housing cover removed

For each WLAN port, there are two R-SMA sockets on a SCALANCE W786 to connect external antennas. The figure above shows how the R-SMA sockets are assigned to the WLAN ports. With a SCALANCE W786-1PRO, only the socket pair labeled "1" exists; with a SCALANCE W786-2PRO the sockets labeled "1" and "2" exist.

Perform the following steps to connect a cable for an external antenna to a SCALANCE W786:

1. Insert the connector on the antenna cable into the R-SMA socket and tighten the sleeve nut on the socket (key size SW8), tightening torque 0.6 Nm. First connect the cable for antenna "B" if you want to use two antennas for an interface. Once the cable for antenna "A" is connected, it is difficult to reach socket "B".
2. Screw a terminating resistor to the unused socket if you use only one antenna on a port.
3. Secure the antenna cable(s) with a strain relief clamp. For more detailed information on this topic, refer to the section "Connecting the cables".

6.8 Inserting / removing the C-PLUG



WARNING

Danger from line voltage

Once you have removed the housing cover, there is the danger from line voltage in the area of the connecting terminals on the power supply adapter.

Only authorized personnel is permitted to open the device and carry out any work on the open device (e.g. connection and disconnection of lines, operating the reset button, replacing the C-PLUG).

NOTICE

A C-PLUG may only be inserted or removed when the device is turned off.

Inserting the C-PLUG

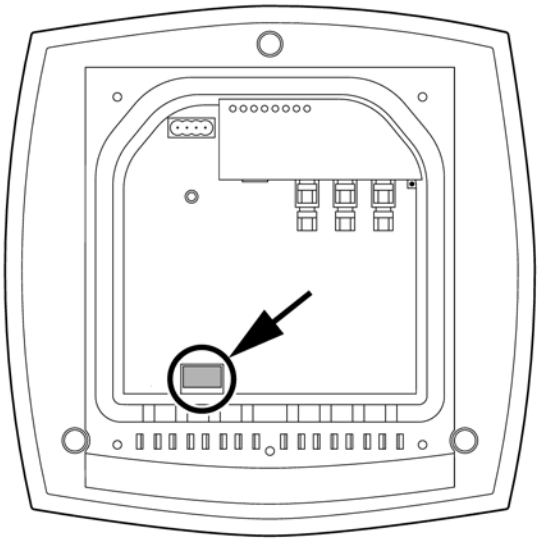


Figure 6-9 Location of the C-PLUG with the housing cover removed

Follow the steps below to insert a C-PLUG in the device:

1. Turn off the power to the device.
2. Remove the housing cover, see section "Removing/fitting the housing cover".
3. Remove the C-PLUG from the slot. The housing of the C-PLUG has a protruding ridge on the long side. The C-PLUG can only be inserted when this ridge is at the top right. The slot in the SCALANCE W786 has a corresponding groove at this position. Make sure that the C-PLUG is inserted completely into the slot.
4. Screw the housing cover back onto the device.

Removing the C-PLUG

Follow the steps below to remove a C-PLUG from the device:

1. Turn off the power to the device.
2. Remove the housing cover, see section "Removing/fitting the housing cover".
3. Insert a screwdriver between the front edge of the C-PLUG and the slot and release the C-PLUG.
4. Remove the C-PLUG from the slot.
5. Screw the housing cover back onto the device.

Technical specifications

7

7.1 SCALANCE W786 technical specifications

Product versions

- SCALANCE W786-1PRO with one wireless interface and in the variants with two internal antennas or two external antenna connectors and with RJ-45 or FO connector
- SCALANCE W786-2PRO with two wireless interfaces and in the variants with four internal antennas or four external antenna connectors and with RJ-45 or FO connector
- SCALANCE W786-2RR with two wireless interfaces and in the variants with four internal antennas or four external antenna connectors and with RJ-45 connector
- SCALANCE W786-3PRO with three wireless interfaces and in the variants with six external antenna connectors and with RJ-45 or with FO connector

Data transfer

Ethernet transfer rate	10/100 Mbps
Wireless transmission rate	1 ... 54 Mbps (108 Mbps)
Wireless standards supported	802.11a 802.11b 802.11g 802.11h
Supported standards for power supply only for variants with RJ-45 connectors	802.3af (Power over Ethernet)

Interfaces

Power	• 48 VDC power supply (minimum permitted voltage 36 VDC, maximum permitted voltage 57 VDC) via supplied connector • RJ-45 jack Power over Ethernet 48 VDC (minimum permitted voltage 36 VDC, maximum permitted voltage 57 VDC) • 2 x 12 - 24 VDC power supplies (minimum permitted voltage 9.6 VDC, maximum permitted voltage 28.8 VDC) with optional power supply adapter (available as accessory) • 100 - 240 VAC with optional power supply adapter (available as accessory) Power supply isolated according to IEEE 802.3af, isolation resistance > 2 Mohms.
Data	• RJ-45 jack for Ethernet or on devices for FO cable: 1 x 2 BFOC sockets • depending on version, up to six R-SMA antenna sockets

Electrical data

Power consumption of variants with RJ-45 connectors	With 1 wireless card	6.5 W
	With 2 wireless cards	8 W
	With 3 wireless cards	9.5 W
Power consumption of variants with fiber-optic cable connectors	With 1 wireless card	8 W
	With 2 wireless cards	9.5 W
	With 3 wireless cards	11 W

Construction

Dimensions (W x H x D)	251 mm x 251 mm x 72 mm	
Weight (version with three IWLAN ports)	Without power supply adapter	2241 g
	With power supply adapter 12 - 24 VDC	2428 g
	With power supply adapter 100 - 240 VAC	2433 g

Permitted ambient conditions

Operating temperature	-40°C to +70°C
Operation with 100 V to 240 V power supply	-40°C to +60°C
You should also note the temperature ranges specified in the approvals.	
Transportation/storage temperature	-40°C to +85°C
Degree of protection	Tested to IP65

MTBF information (mean time between failure)

MTBF	61 years

Transmit power

Table 7- 1 Transmit power in IEEE 802.11b mode (2.4 GHz)

Data rate [Mbps]	P_0 [dBm]
1	20
2	20
5.5	20
11	20

Table 7- 2 Transmit power in IEEE 802.11g mode (2.4 GHz)

Data rate [Mbps]	P_0 [dBm]
6	17
9	17
12	17
18	17
24	17
36	17
48	17
54	16

Table 7- 3 Transmit power in IEEE 802.11a/h mode (5 GHz)

Data rate [Mbps]	P_0 [dBm]
6	17
9	17
12	17
18	17
24	17
36	16
48	15
54	13.5

Receiver sensitivity

Table 7- 4 Receiver sensitivity in IEEE 802.11b mode (2.4 GHz)

Data rate [Mbps]	P_e [dBm]
1	-98
2	-94
5.5	-92
11	-90

Table 7- 5 Receiver sensitivity in IEEE 802.11g mode (2.4 GHz)

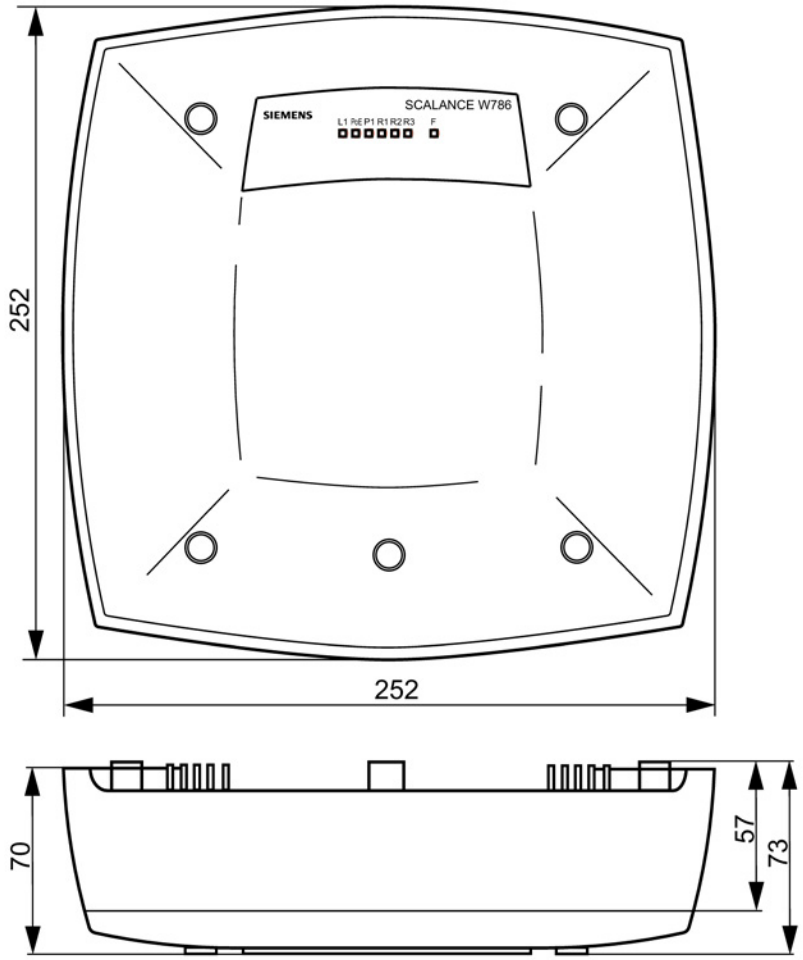
Data rate [Mbps]	P_e [dBm]
6	-93
9	-92
12	-91
18	-88
24	-85
36	-82
48	-77
54	-76

Table 7- 6 Receiver sensitivity in IEEE 802.11a/h mode (5 GHz)

Data rate [Mbps]	P_e [dBm]
6	-90
9	-89
12	-88
18	-86
24	-83
36	-80
48	-75
54	-74

7.2 Dimension drawing SCALANCE W786

Front view and view from above of the SCALANCE W786



7.3 Permitted antennas

Accessories for SCALANCE W-700

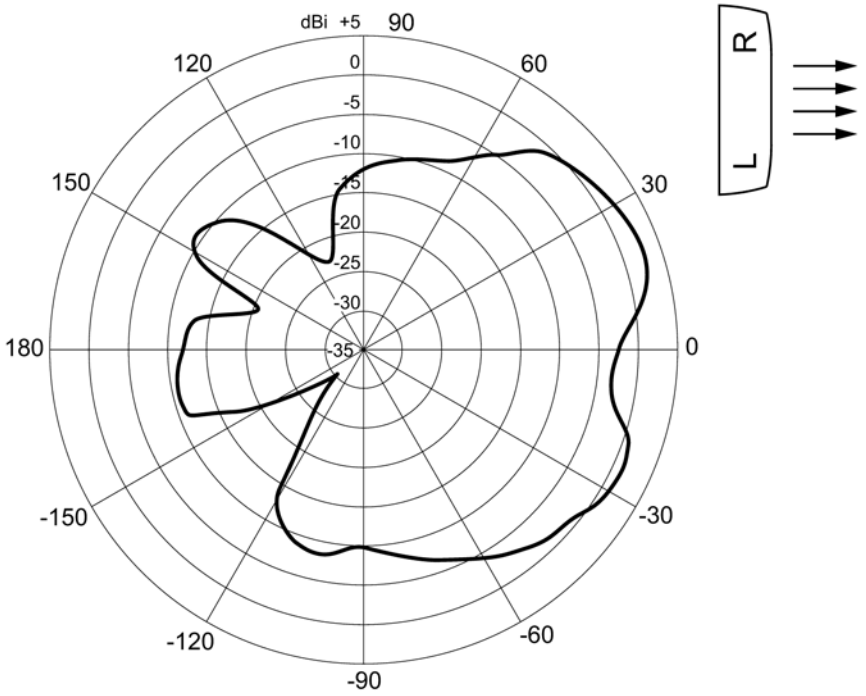
Note

When you select an antenna, keep in mind the national approvals for your SCALANCE W7xx.

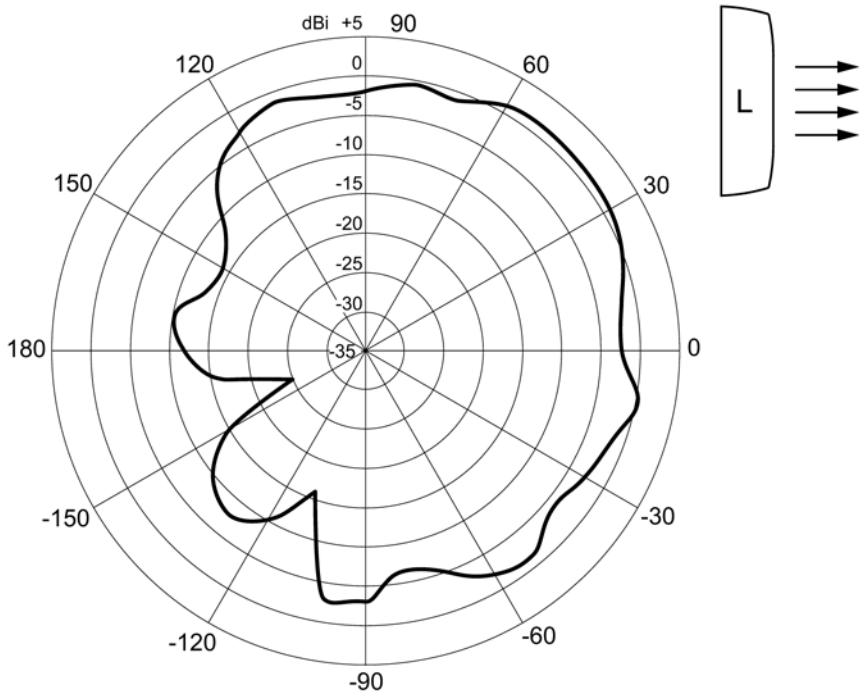
Characteristics	Type	Frequency / GHz	Antenna gain / dBi	Impedance / Ω	Order No.
Omni	ANT795-6MN	2.4	6	50	6GK5795-6MN00-0AA6
		5	8		
Omni	ANT792-6MN	2.4	6	50	6GK5792-6MN00-0AA6
Omni	ANT793-6MN	5	5	50	6GK5793-6MN00-0AA6
Patch	ANT795-6DN	2.4	9	50	6GK5795-6DN00-0AA6
		5	9		
Directional antenna	ANT792-8DN	2.4	14	50	6GK5792-8DN00-0AA6
Directional antenna	ANT793-8DN	5	18	50	6GK5793-8DN00-0AA6
Helix (for RCoax)	ANT792-4DN	2.4	4	50	6GK5792-4DN00-0AA6
λ5/8 (for RCoax)	ANT793-4MN	5	6		6GK5793-4MN00-0AA6
RCoax	IWLAN RCoax PE 1/2" 2.4 GHz	2.4	0	50	6XV1875-2A
RCoax	IWLAN RCoax PE 1/2" 5 GHz	5	0	50	6XV1875-2D

7.4 Radiation patterns diagrams of SCALANCE W786 internal antennas

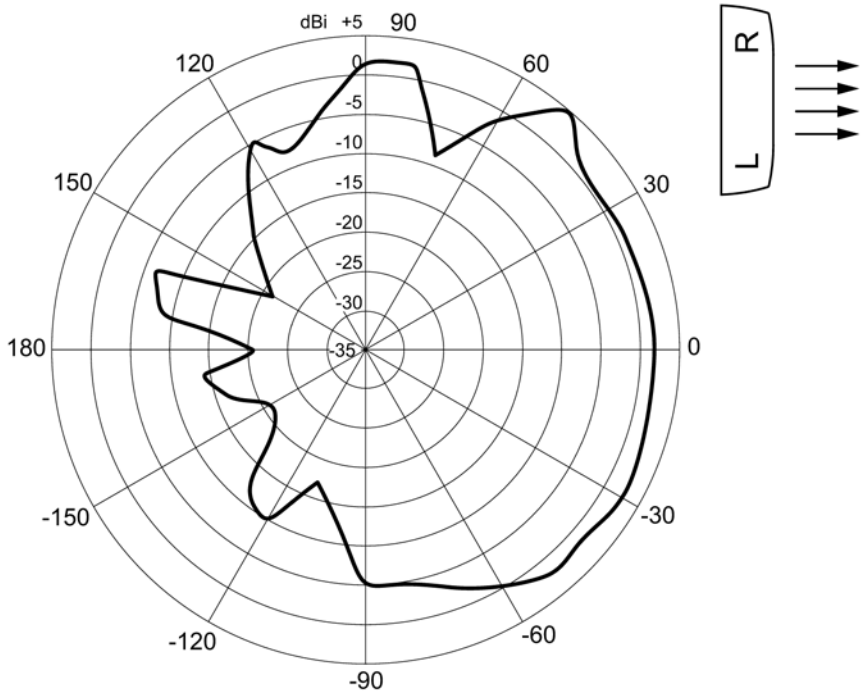
Horizontal radiation pattern 2500 MHz



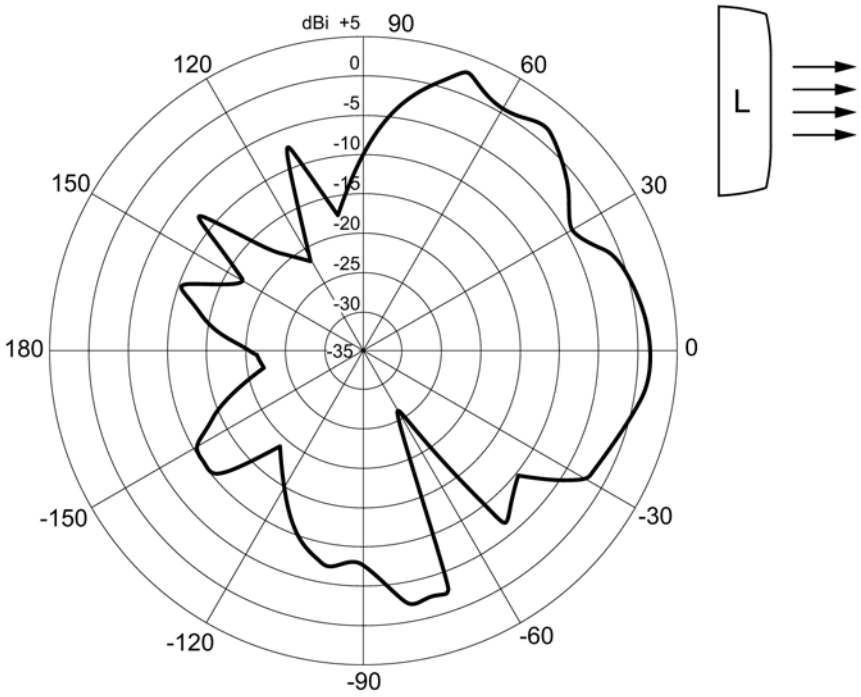
Vertical radiation pattern 2500 MHz



Horizontal radiation pattern 5800 MHz



Vertical radiation pattern 5800 MHz



Certification

8

8.1 Approvals for SCALANCE W786

CE conformity

The products

SIMATIC NET SCALANCE W786-1PRO
SIMATIC NET SCALANCE W786-2PRO
SIMATIC NET SCALANCE W786-3PRO
SIMATIC NET SCALANCE W786-2RR
in the version put into circulation by Siemens AG meet the regulations of the following European directives:

- 99/5/EC
  Directive of the European Parliament and of the Council on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity. Conformity with the basic requirement of the directive is attested by adherence to the following standards:
- EN 60950-1
  Information technology equipment - Safety - Part 1: General requirements
- EN 301489-1 V1.9.2
  Electromagnetic compatibility and radio spectrum matters (ERM) - Electromagnetic compatibility for radio equipment and services - Part 1 : Common technical requirements (V1.9.2).
- EN 301489-17 V2.2.1
  Electromagnetic compatibility and radio spectrum matters (ERM) - Electromagnetic compatibility for radio equipment and services - Part 17: Specific conditions for 2.4 GHz broadband transmission systems and 5 GHz high performance RLAN equipment
- EN 300328 V1.7.1
  Electromagnetic Compatibility and Radio Spectrum Matters (ERM); — Broadband transmission systems — Data transmission equipment operating in the 2.4 GHz ISM band and using spread spectrum modulation techniques — Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive
- EN 301893 V1.7.1
  Broadband Radio Access Networks (BRAN) - 5 GHz high performance RLAN - Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive

- EN 50385
  Product standard to demonstrate the compliance of radio base stations and fixed terminal stations for wireless telecommunication systems with the basic restrictions or the reference levels related to human exposure to radio frequency electromagnetic fields (110 MHz - 40 GHz) - General public
- 1999/519/EC
  Council recommendation on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)

Devices connected to the system must meet the relevant safety regulations.

The EC Declaration of Conformity is available for the responsible authorities according to the above-mentioned EC Directive at the following address:

Siemens Aktiengesellschaft
Industry Sector
Postfach 4848
D-90026 Nürnberg

This declaration certifies compliance with the directives named above, but does not guarantee any specific properties.

Note

The specified approvals apply only when the corresponding mark is printed on the product.

ATEX, FM and cULus approvals

The products

SCALANCE W786-1PRO
SCALANCE W786-2PRO
SCALANCE W786-3PRO
SCALANCE W786-2RR

have the following approvals

- EN 60079-15 : 2005
  EN 60079-0 : 2006
  II 3 G Ex nA II T4
  KEMA 07 ATEX 0145 X
  Ta: -40 °C to +60 °C
- FM 3611
  CL. 1, Div. 2 GP.A.B.C.D T4
  CL. 1, Zone 2, GP.IIC. T4
  Ta: -40 °C ... +70 °C
  100 V ... 240 V Ta: -40 °C to +60 °C
- c-UL-us
  UL 60950-1, CSA C22.2 No. 60950-1
  Ta: -40 °C ... 70°C
  100 V ... 240 V Ta: -40 °C to +60 °C
- c-UL-us for hazardous location:
  UL 1604, CSA C22.2 No. 213-M1987
  CL. 1, Div. 2 GP. A.B.C.D T4
  CL. 1, Zone 2, GP, IIC, T4
  Ta : -40°C … 70°C
  100 V ... 240 V Ta: -40 °C to +60 °C

Note

The specified approvals apply only when the corresponding mark is printed on the product.

NEMA 4X

The products

SCALANCE W786-1PRO
SCALANCE W786-2PRO
SCALANCE W786-3PRO
SCALANCE W786-2RR

have the following approval

- NEMA 250 : 2003

Other approvals

The products

SCALANCE W786-1PRO
SCALANCE W786-2PRO
SCALANCE W786-3PRO
SCALANCE W786-2RR

meet the stipulations of the following directives or standards:

- Directive 72/245/EC, last changed by directive 2006/28/EC
  Type approval number e1*72/245*2006/28*5311*00
  E1: Number of approval 025311

Note

The requirements are met only when the device is screwed to a mounting plate and a cover plate for the cabling. For detailed information, refer to the section "Mounting with mounting plate".

Certification ID

The following table shows the product names and the corresponding certification ID:

Type	Number and type of Ethernet ports	Number of internal antennas	Number of R-SMA sockets for external antennas	Certification ID Order no. Order no. US variant
W786-1PRO	1 RJ-45	2 (diversity)	—	**EAP-W1-RJ-I1** 6GK5786-1BA60-2AA0 6GK5786-1BA60-2AB0
W786-1PRO	1 RJ-45	—	2	**EAP-W1-RJ-E1** 6GK5786-1AA60-2AA0 6GK5786-1AA60-2AB0
W786-1PRO	1 ST duplex multimode FO cable	2 (diversity)	—	**EAP-W1-MM-I1** 6GK5786-1BB60-2AA0 6GK5786-1BB60-2AB0
W786-1PRO	1 ST duplex multimode FO cable	—	2	**EAP-W1-MM-E1** 6GK5786-1AB60-2AA0 6GK5786-1AB60-2AB0
W786-2PRO	1 RJ-45	4 (diversity)	—	**EAP-W2-RJ-I2** 6GK5786-2BA60-2AA0 6GK5786-2BA60-2AB0
W786-2PRO	1 RJ-45	—	4	**EAP-W2-RJ-E2** 6GK5786-2AA60-2AA0 6GK5786-2AA60-2AB0
W786-2PRO	1 ST duplex multimode FO cable	4 (diversity)	—	**EAP-W2-MM-I2** 6GK5786-2BB60-2AA0 6GK5786-2BB60-2AB0
W786-2PRO	1 ST duplex multimode FO cable	—	4	**EAP-W2-MM-E2** 6GK5786-2AB60-2AA0 6GK5786-2AB60-2AB0
W786-2RR	1 RJ-45	4 (diversity)	—	**EAP-W2-RJ-I2** 6GK5786-2BA60-6AA0 6GK5786-2BA60-6AB0
W786-2RR	1 RJ-45	—	4	**EAP-W2-RJ-E2** 6GK5786-2AA60-6AA0 6GK5786-2AA60-6AB0
W786-3PRO	1 RJ-45	—	6	**EAP-W3-RJ-E3** 6GK5786-3AA60-2AA0 6GK5786-3AA60-2AB0
W786-3PRO	1 ST duplex multimode FO cable	—	6	**EAP-W3-MM-E3** 6GK5786-3AB60-2AA0 6GK5786-3AB60-2AB0

SIEMENS

Declaration of Conformity

Manufacturer / responsible person	Alfred Hümmer
Address:	Siemens AG I IA SC CI Gleiwitzer Str. 555 90475 Nuremberg Germany

Declares that the product:

type:	Industrial WLAN Access Point EAP Family
model:	**EAP-W1-RJ-E1** **EAP-W1-RJ-I1** **EAP-W2-RJ-E2** **EAP-W2-RJ-I2** **EAP-W3-RJ-E3** **EAP-W1-MM-E1** **EAP-W1-MM-I1** **EAP-W2-MM-E2** **EAP-W2-MM-I2** **EAP-W3-MM-E3**
Intended use	Wireless Communication

Complies with the essential requirements of Article 3 of the R&TTE 1999/5/EC Directive, if used for its intended use and that the following standards has been applied:

1. Safety (Article 3.1.a of the R&TTE Directive)

Applied standard(s)	issue
EN 60950-1	**2006 + A11:2009 + A1:2010 + A12:2011 + AC:2011**

2. Electromagnetic compatibility (Article 3.1.b of the R&TTE Directive)

Applied standard(s)	issue
EN 301489-1 V1.9.1	**2011-04**
EN 301489-17 V2.2.1	**2012-09**

3. efficient use of the radio frequency spectrum (Article 3.2 of the R&TTE Directive)

Applied standard(s)	issue
EN 300 328 V1.7.1	**2006-10**
EN 301 893 V1.7.1	**2012-06**

4. Health (Article 3.1a of the R&TTE Directive)

Applied standard(s)	issue
EN 50385	**2002**
1999/519/EC	

Siemens Aktiengesellschaft

int

08

Nuremberg, 05.June 2013
(Place and Date)

i.V.
Thomas Grötschel

i.V.
Alfred Hümmer

FCC approval

This device complies with Part 15 of the FCC Rules

Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

IEEE802.11b or g operation of this product in the USA is firmware-limited to channels 1 through11.

Notice

Changes or modifications made to this equipment not expressly approved by SIEMENS may void the FCC authorization to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Notice

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Professional Installation Notice:

To comply with FCC part 15 rules in the United States, the system must be professionally installed to ensure compliance with the Part 15 certification. It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in the United States. The use of the system in any other combination (such as co-located antennas transmitting the same information) is expressly forbidden.

Note

In the USA, the "ANT793-8DN" antenna is approved only for wireless mode 802.11a!

Note

The specified approvals apply only when the corresponding mark is printed on the product.

RSS-210 of Industry Canada

"Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device."

"This device has been designed to operate with the antennas listed below*, and having a maximum gain of 18 dBi. Antennas not included in this list or having a gain greater than 18 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms."

"To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication."

"That the device for the band 5150-5250 MHz is only for indoor usage to reduce potential for harmful interference to co-channel mobile satellite systems."

"Users should also be cautioned to take note that high power radars are allocated as primary users (meaning they have priority) of 5250-5350 MHz and 5650-5850 MHz and these radars could cause interference and/or damage to LE-LAN devices."

* For more detailed information on the approved antennas, refer to the section "Technical specifications".

Note

In Canada, the "ANT793-8DN" antenna is approved only for wireless mode 802.11a!

Note

The specified approvals apply only when the corresponding mark is printed on the product.

NCC Warning Statement (Taiwan)

Article 12
Without permission, any company, firm or user shall not alter the frequency, increase the power, or change the characteristics and functions of the original design of the certified lower power frequency electric machinery.

Article 14
The application of low power frequency electric machineries shall not affect the navigation safety nor interfere a legal communication, if an interference is found, the service will be suspended until improvement is made and the interference no longer exists.

Note

The "ANT793-8DN" antenna is not approved in Taiwan!

Note

The specified approvals apply only when the corresponding mark is printed on the product.

KCC Statement (Republic of Korea)

사용자안내문(제5조제1항제1호관련)

기종별	사용자안내문
A 급 기기 (업무용 방송통신기기)	이 기기는 업무용(A 급)으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

"당해 무선설비는 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없음"

Note

The specified approvals apply only when the corresponding mark is printed on the product.

Notes on approval in Mexico

Certification ID	Certification number
EAP-W1-RJ-E1	RCPSIEA08-0713
EAP-W1-RJ-I1	RCPSIEA08-0713-A1
EAP-W1-MM-E1	RCPSIEA08-0713-A5
EAP-W1-MM-I1	RCPSIEA08-0713-A6

Certification ID	Certification number
EAP-W2-RJ-E2	RCPSIEA08-0713-A2
EAP-W2-RJ-I2	RCPSIEA08-0713-A3
EAP-W2-MM-E2	RCPSIEA08-0713-A7
EAP-W2-MM-I2	RCPSIEA08-0713-A8
EAP-W3-RJ-E3	RCPSIEA08-0713-A4
EAP-W3-MM-E3	RCPSIEA08-0713-A9

Notes on approval in Argentina

Certification ID	Certification number
EAP-W1-RJ-E1	CNC:C-6884
EAP-W1-RJ-I1	CNC:C-6881
EAP-W1-MM-E1	CNC:C-6876
EAP-W1-MM-I1	CNC:C-6875
EAP-W2-RJ-E2	CNC:C-6882
EAP-W2-RJ-I2	CNC:C-6879
EAP-W2-MM-E2	CNC:C-6878
EAP-W2-MM-I2	CNC:C-6885
EAP-W3-RJ-E3	CNC:C-6873
EAP-W3-MM-E3	CNC:C-6877

Note on approval in Bahrain

The operator/owner of this device must comply with the 2.4 GHz and 5 GHz Frequency Licensing Regulation and technical specifications, and must also obtain the necessary licenses in order to use these frequencies in accordance with the Telecommunications Law (refer to section 43 and 44).

Notes on approval in Brazil





















Note

The specified approvals apply only when the corresponding mark is printed on the product.

8.2 National approvals

National approvals

The following table lists the countries in which the SCALANCE W700 product is approved. The diamond symbol (♦) identifies all countries for which there was no approval at the time these operating instructions were written.

The current status of the approvals can be found on the Internet at the following address:

`Http://www.siemens.com/funkzulassungen`

Column	Meaning
Country	Country
Mode	IEEE 802.11 standard and the TPC and / or DFS functionality, where required
CH	Channel
MHz	Frequency
PWR (EIRP)	Maximum permitted effective isotropic radiated power
Use	Permitted use indoors and / or outdoors

Country	Mode	CH	MHz	PWR (EIRP)	Use
Egypt	11b 11g 11g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor only
		149 - 165	5745 - 5825	200 mW	Indoor + outdoor
	11h DFS+TPC	52 - 64	5260 - 5320	200 mW	Indoor only
Angola	11b 11g 11g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor only
	11h DFS+TPC	36 - 64	5180 - 5320	200 mW	Indoor only
		100 - 116	5500 - 5580	1000 mW	Indoor + outdoor
		132 - 140	5660 - 5700	1000 mW	Indoor + outdoor
Argentina	11b 11g	1 - 13	2412 - 2472	1000 mW	Indoor + outdoor
	11a TPC	52 - 64	5260 - 5320	250 mW	Indoor + outdoor
		149 - 161	5745 - 5805	1000 mW	Indoor + outdoor

Country	Mode	CH	MHz	PWR (EIRP)	Use
Australia 	11b 11g 11g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 64	5180 - 5320	200 mW	Indoor only
		149 - 165	5745 - 5825	1000 mW	Indoor + outdoor
	11a Turbo TPC	42	5210	50 mW	Indoor only
		50 58	5250 5290	200 mW	Indoor only
		152 160	5760 5800	1000 mW	Indoor + outdoor
Bahrain	11b 11g 11g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor only
	11h DFS+TPC	36 - 64	5180 - 5320	200 mW	Indoor only
		149 - 165	5745 - 5825	1000 mW	Indoor + outdoor
Brazil	11b 11g 11g Turbo	1 - 13	2412 - 2472	400 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor only
		149 - 165	5745 - 5825	1000 mW	Indoor + outdoor

Country	Mode	CH	MHz	PWR (EIRP)	Use
Chile	11b	1 - 13	2412 - 2472	100 mW	Indoor only
	11h DFS+TPC	36 - 64	5180 - 5320	100 mW	Indoor only
		149 - 165	5745 - 5825	100 mW	Indoor only
	11h Turbo DFS+TPC	42	5210	100 mW	Indoor only
		50 58	5250 5290	100 mW	Indoor only
		152 160	5760 5800	100 mW	Indoor only
China	11b 11g 11g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	149 - 165	5745 - 5825	1000 mW	Indoor + outdoor

Country	Mode	CH	MHz	PWR (EIRP)	Use
Belgium Bulgaria Denmark Germany Estonia Finland France Greece Great Britain Ireland Iceland Italy Latvia Liechtenstein Lithuania Luxembourg Malta Netherlands Norway Austria Poland Portugal Romania Sweden Switzerland Slovakia Slovenia Spain Czech Republic Hungary Cyprus CE	11b 11g 11g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor only
	11h DFS+TPC	36 - 64	5180 - 5320	200 mW	Indoor only
		100 - 116	5500 - 5580	1000 mW	Indoor + outdoor
		132 - 140	5660 - 5700	1000 mW	Indoor + outdoor
Hong Kong OFTA 電訊管理局	11b 11g 11g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor only
	11h DFS+TPC	36 - 64	5180 - 5320	200 mW	Indoor only
		100 - 116	5500 5580	1000 mW	Indoor + outdoor
		132 - 140	5660 5700	1000 mW	Indoor + outdoor

Country	Mode	CH	MHz	PWR (EIRP)	Use
India	11b 11g	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 64	5180 - 5320	200 mW	Indoor only
		149 - 165	5745 - 5825	200 mW	Indoor only
Japan 	11b	1 - 14	2412 - 2484	100 mW	Indoor + outdoor
	11g	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	184 - 196	4920 - 4980	200 mW	Indoor + outdoor
		8 12 16	5040 5060 5080	200 mW	Indoor + outdoor
		36 - 48	5180 - 5240	200 mW	Indoor only
	11h DFS+TPC	100 - 140	5500 - 5700	200 mW	Indoor + outdoor
Canada	11b 11g	1	2412	200 mW	Indoor + outdoor
		2 - 10	2417 - 2457	1000 mW	Indoor + outdoor
		11	2462	200 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor only
		149 - 165	5745 - 5825	1000 mW	Indoor + outdoor
	11a Turbo TPC	42	5210	200 mW	Indoor only
		152 160	5760 5800	1000 mW	Indoor + outdoor
	11h DFS+TPC	52 - 64	5260 - 5320	200 mW	Indoor + outdoor
		100 - 140	5500 - 5700	200 mW	Indoor + outdoor

Country	Mode	CH	MHz	PWR (EIRP)	Use
Colombia	11b 11g	1	2412	200 mW	Indoor + outdoor
		2 - 10	2417 - 2457	1000 mW	Indoor + outdoor
		11	2462	200 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor only
		149 - 165	5745 - 5825	1000 mW	Indoor + outdoor
	11a Turbo TPC	152 160	5760 5800	1000 mW	Indoor + outdoor
Croatia	11b 11g 11g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor only
	11h DFS+TPC	36 - 64	5180 - 5320	200 mW	Indoor only
		100 - 140	5500 - 5700	1000 mW	Indoor + outdoor
Kuwait	11b 11g 11g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a	36 - 48	5180 - 5240	200 mW	Indoor + outdoor
	11h	52 - 64	5260 - 5320	200 mW	Indoor + outdoor
Malaysia	11b 11g	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	56 60 64	5280 5300 5320	200 mW	Indoor only
		149 - 165	5745 - 5825	1000 mW	Indoor + outdoor

Country	Mode	CH	MHz	PWR (EIRP)	Use
Macedonia	11b 11g 11g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor only
	11h DFS+TPC	36 - 64	5180 - 5320	200 mW	Indoor only
		100 - 116	5500 - 5580	1000 mW	Indoor + outdoor
		132 - 140	5660 - 5700	1000 mW	Indoor + outdoor
Mexico	11b 11g 11g Turbo	1 - 11	2412 - 2462	500 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor + outdoor
		52 - 64	5260 - 5320	1000 mW	Indoor + outdoor
		149 - 165	5745 - 5825	1000 mW	Indoor + outdoor
	11a Turbo TPC	152 160	5760 5800	1000 mW	Indoor + outdoor
Mozambique	11b 11g 11g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor only
	11h DFS+TPC	36 - 64	5180 - 5320	200 mW	Indoor only
		100 - 116	5500 - 5580	1000 mW	Indoor + outdoor
		132 - 140	5660 - 5700	1000 mW	Indoor + outdoor

Country	Mode	CH	MHz	PWR (EIRP)	Use
Peru	11b 11g 11g Turbo	1	2412	200 mW	Indoor + outdoor
		2 - 10	2417 - 2457	1000 mW	Indoor + outdoor
		11	2462	200 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor only
		149 - 165	5745 - 5825	1000 mW	Indoor + outdoor
Russia	11b 11g	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	50 mW	Indoor + outdoor
		52 - 64	5260 - 5320	250 mW	Indoor + outdoor
		100 - 140	5500 - 5700	1000 mW	Indoor + outdoor
		149 - 165	5745 - 5825	1000 mW	Indoor + outdoor
Saudi Arabia	11b 11g 11 g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
Serbia	11b 11g 11g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor only
	11h DFS+TPC	36 - 64	5180 - 5320	200 mW	Indoor only
		100 - 116	5500 - 5580	1000 mW	Indoor + outdoor
		132 - 140	5660 - 5700	1000 mW	Indoor + outdoor

Country	Mode	CH	MHz	PWR (EIRP)	Use
Singapore	11b 11g	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor + outdoor
		149 - 165	5745 - 5825	1000 mW	Indoor + outdoor
	11h DFS+TPC	52 - 64	5260 - 5320	200 mW	Indoor + outdoor
	11h Turbo DFS+TPC	42 50 58	5210 5250 5290	100 mW	Indoor + outdoor
		152 160	5760 5800	100 mW	Indoor + outdoor
South Africa	11b 11g 11g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	60 mW	Indoor only
	11h DFS+TPC	36 - 64	5180 - 5320	200 mW	Indoor only
		100 - 116	5500 - 5580	1000 mW	Indoor + outdoor
		132 - 140	5660 - 5700	1000 mW	Indoor + outdoor
South Korea	11b 11g	1 - 13	2412 - 2472	40 mW (RHS power=10mW /MHz)	Indoor + outdoor
	11a TPC	149 - 161	5745 - 5805	200 mW (RHS power=10mW /MHz)	Indoor + outdoor

Country	Mode	CH	MHz	PWR (EIRP)	Use
Taiwan 	11b 11g 11g Turbo	1	2412	200 mW	Indoor + outdoor
		2 - 10	2417 - 2457	1000 mW	Indoor + outdoor
		11	2462	200 mW	Indoor + outdoor
	11a TPC	56 - 64	5280 - 5320	50 mW	Indoor only
		149 - 165	5745 - 5825	1000 mW	Indoor + outdoor
	11h DFS+TPC	100 - 140	5500 - 5700	250 mW	Indoor + outdoor
Turkey	11b 11g 11g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	60 mW	Indoor only
	11h DFS+TPC	36 - 64	5180 - 5320	200 mW	Indoor only
Ukraine 	11b 11g 11g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 64	5180 - 5320	200 mW	Indoor + outdoor
Uruguay	11b 11g	1	2412	200 mW	Indoor + outdoor
		2 - 10	2417 - 2457	1000 mW	Indoor + outdoor
		11	2462	200 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor only
		149 - 165	5745 - 5825	1000 mW	Indoor + outdoor

Country	Mode	CH	MHz	PWR (EIRP)	Use
United Arab Emirates	11b 11g 11g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor only
	11h DFS+TPC	36 - 64	5180 - 5320	200 mW	Indoor only
		100 - 116	5500 - 5580	1000 mW	Indoor only
		132 - 140	5660 - 5700	1000 mW	Indoor only
Venezuela	11b 11g 11g Turbo	1 - 13	2412 - 2472	1000 mW	Indoor + outdoor
	11a TPC	36 - 64	5180 - 5320	200 mW	Indoor only
		149 - 165	5745 - 5825	200 mW	Indoor + outdoor
	11h	52 - 64	5260 - 5320	1000 mW	Indoor + outdoor
United States of America	11b 11g	1	2412	200 mW	Indoor + outdoor
		2 - 10	2417 - 2457	1000 mW	Indoor + outdoor
		11	2462	200 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor only
		149 - 165	5745 - 5825	1000 mW	Indoor + outdoor
	11a Turbo TPC	152 160	5760 5800	1000 mW	Indoor + outdoor

Country	Mode	CH	MHz	PWR (EIRP)	Use
Vietnam	11b 11g 11g Turbo	1 - 13	2412 - 2472	100 mW	Indoor + outdoor
	11a TPC	36 - 48	5180 - 5240	200 mW	Indoor only
	11h DFS+TPC	52 - 64	5260 - 5320	200 mW	Indoor + outdoor

The following notice applies only to the SCALANCE W786-2HPW:

Note

Before commissioning the SCALANCE W786-2HPW, check that the Hipath Wireless Controller required for operation is also approved in the country of use.